Biological Data on Fish in the Upper and Lower Rivière la Martre, Northwest Territories

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BIOLOGICAL DATA ON FISH IN THE UPPER AND LOWER RIVIÈRE LA MARTRE, NORTHWEST TERRITORIES

by

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ABSTRACT

Chang-Kue, K.T.J., G. MacDonald, and E.F. Jessop. 1987. Biological data on fish in the upper and lower Rivière la Martre, Northwest Territories. Can. Data Rep. Fish. Aquat. Sci. 660: iv + 58 p.

The fish populations in the Rivière la Martre, Northwest Territories were sampled between May and September, 1975. The La Martre Falls (23 m) divided the study area into an upper and lower area. Biological data presented include length, weight, age, sex, species distribution and relative abundance for both large and small fish species. Summaries of stomach contents and the catch by mesh size are also included.

Key words: catch composition; fishery surveys; gillnets; population structure; lake whitefish (Coregonus clupeaformis); round whitefish (Prosopium cylindraceum); northern pike (Esox lucius); yellow walleye (Stizostedion vitreum vitreum); longnose sucker (Catostomus catostomus).

RÉSUMÉ

Chang-Kue, K.T.J., G. MacDonald, and E.F. Jessop. 1987. Biological data on fish in the upper and lower Rivière la Martre, Northwest Territories. Can. Data Rep. Fish. Aquat. Sci. 660: iv + 58 p.

Des échantillons ont été prélevés à même les populations de poisson dans la rivière la Martre, dans les Territoires du Nord-Ouest, entre mai et septembre 1975. Dans le cadre de l'étude, les chutes La Martre (23 m) séparaient le secteur d'aval du secteur d'amont. Les données biologiques présentées comprennent la longueur, le poids, l'âge, le sexe, la distribution selon les espèces et l'abondance relative pour les petites et les grandes espèces. Des sommaires du contenu de l'estomac des sujets ainsi que des prises par grandeur de maille sont également donnés.

Mots-clés: Composition des prises; études sur les pêches; filets maillants; structure du peuplement; grand corégone (Coregonus clupeaformis); ménomini rond (Prosopium cylindraceum); grand brochet (Esox lucius); doré jaune (Stizostedion vitreum vitreum); meunier rouge (Catostomus catostomus).

INTRODUCTION

In early 1975, Northern Canada Power Commission (NCPC) identified the la Martre Falls on Rivière la Martre as an economically attractive hydro site in the Yellowknife area, north of the Great Slave Lake. Development of the head available could result in the production of 275 million kW·h per annum. The Department of Fisheries and Oceans (DFO) conducted a survey of the Rivière la Martre in the summer of 1975 to obtain baseline biological information in response to this proposal. The proposed development, however, was deferred by the proponent and the fish data collected were never utilized for the immediate impact assessment that was anticipated. This report summarizes the fish data gathered in May to September 1975 by the DFO crew based above the la Martre Falls and by a second crew based below the falls. No previous data on fish in the river were available, although test survey data and commercial fishery statistics on Lac la Martre were reported by Libosvarsky (1970), Bond (1973) and Moshenko (1980).

DESCRIPTION OF THE STUDY AREA

The Rivière la Martre with a drainage area of about 14 976 km^2 is the largest river flowing out of Lac la Martre (elev. 265 m), a 1693 km^2 lake located 192 km northwest of Yellowknife, NWT (Fig. 1). The headwaters of the system are at 64°46'N and 119°30'W on the Rivière Grandin which enters the lake on the northwest shore as the major inlet. The outflow originates at the southeast corner of Lac la Martre and flows 50 km to its confluence with the Marian River. The Marian River drains through Marian Lake into Great Slave Lake. The system lies within the zone of discontinuous permafrost and is entirely south of the tree line.

Lac la Martre and the upper Rivière la Martre are located on the eastern edge of the Interior Plains, an area typified by flat bedrock surface with the occasional esker and some pitted outwash in the area of the lake (Craig 1965). Anders (1966) provided details of the area's physiography. La Martre Falls (23 m) (Fig. 2) are located on an escarpment which separates the Interior Plains to the west from the Canadian Shield to the east. Where the river crosses it the escarpment is 87 m high and 5.5 km wide. The bedrock of the lower river is mostly covered with overburden.

Between the Lac la Martre outflow and Portage Rapids (Fig. 3) the Rivière la Martre is generally wide and shallow with a slow current and a bottom of fine white sand. Boyer Lake is a shallow (1-3 m deep) flat-bottom lake containing numerous semi-submerged islands of silty sand. Emergent vegetation covers much of the river and lake by midsummer. At Portage Rapids (2.4 m) the river intersects a small eskeroid feature resulting in a constricted channel with a fast current and a boulder bottom. Between Portage Rapids and la Martre Falls the river once more becomes wide and slow with numerous shallow channels divided by semi-submerged sand islands.

The 5 km section of river immediately below la Martre Falls has a very strong current and areas of deep, clear water alternate with rapids over extensive bare sand and gravel shallows (Fig. 4). There is little bottom or peripheral vegetation. Between the lowest set of rapids and the island area (Loc. 25, 26, 27) the river has a more uniform width (30-50 m) and depth (2 m). The strong current flows over an unvegetated sand, gravel and rock bottom but emergent vegetation occurs in narrow shallow areas bordering either side of the main channel. In the island area the main channel becomes shallow and wide and flows centrally between the islands. Shallow side channels between the islands and shore receive less current and are heavily vegetated by midsummer. Below the islands the main channel becomes irregular once more. At wide meandering bends the current is relatively slow and the main channel is deep as it switches from side to side among extensive weed choked shallows. Slumping shoreline occurs extensively and there are numerous back eddies. In straight sections of river the water becomes shallow and fast as it flows over extensive shelves of rock and gravel. From Location 45 to its confluence with the Marian River, the la Martre is very uniform across its width. The current is slow and the channel deep with a heavily vegetated mud and silt bottom. Slumping shoreline occurs frequently and there are several areas of exposed bedrock.

METHODS AND MATERIALS

For the purpose of this study, Rivière la Martre was divided into two distinct areas. The section above la Martre Falls to the Lac la Martre outflow was designated as the upper river study area (Fig. 3) and the section below the falls to the junction of the Marian River was the lower river study area (Fig. 4). A two-man crew was assigned to each area from May to September 1975.

Experimental gillnetting was conducted to obtain a sample representative of the population and a concurrent tagging program was done to study fish movement. A survey of small fish was carried out to detect the presence of fry and small fish species.

Gillnets were used in the fish population study while both angling and gillnetting were conducted to collect fish for tagging. Gillnets were either Swedish gillnets gangs or single panel nets. Swedish gangs were 30 m long and consisted of six 5 m panels of 38, 51, 76, 102, 127 and 140 mm stretched mesh. Single panel nets were 23 m long and had one mesh size of either 25, 51, 76, 102 or 127 mm stretched mesh. Juvenile and small fish species were collected with beach seines and minnow traps. The minnow traps used were of a galvanized metal cage construction. The seine used was 9.1 m long and 91 cm deep and made of 6.4 mm oval delta mesh.

A portable trapnet (1.2 x 1.2 x 2.5m) was set up in Boyer Lake (loc.B1) between 9 June and 4 July to determine its catch effectiveness. The trap was moved to location 6, the outlet of Lac la Martre on 22 August.

Fish species captured were identified according to McPhail and Lindsey (1970). Table 1 lists the scientific and common names of fishes captured during the study. Fork length (±1 mm), weight (±50 g), aging structures (scales), sex and stage of maturity were taken from fish taken by gillnets and angling. Ages were obtained for most Stizostedion v. vitreum, Coregonus clupeaformis, Esox lucius, Prosopium cylindraceum and Thymallus arcticus. Scales were mounted between glass slides and aged by counting annuli on a Leitz trichinoscope. Only completed annuli were counted.

Data collected were analyzed using an Amdahl 5850 computer. The Statistical Analysis System (SAS 1982) was used to generate length, weight, age, sex and maturity summaries.

Condition factor (K) was calculated for individual fish from:

$$K = (W \times 10^5) / L^3$$

Where W = weight (g)
L = fork length (mm)

Length-weight relationships for the sample of each species were described by the following equation.

$$\log_{10} W = a + b (\log_{10} L)$$

Where W = weight (g)
L = fork length (mm)

RESULTS

SPECIES DISTRIBUTION

Data on species distribution and set time by sampling site for fish gillnetted are presented for the upper and lower Rivière la Martre in Tables 2 and 3 respectively. Sampling locations 6 to 10 and 11 to 20 in the upper river were consecutive sampling sections of the river, each of which may have had 2-4 different sampling sites during the course of the study (Fig. 3). The other sampling locations in the upper river (1 to 5 and B1 to B7) and in the lower river (Fig. 4) were exact net setting sites. Swedish nets were used most frequently in the upper river, while swifter waters necessitated the use of the heavier single panel nets in the lower river. A breakdown by biweekly period of species distribution and set time is presented in Table 4. Note that the data for the upper river is divided into lake and river sections.

Species distribution and sampling duration for fish angled is presented in Table 5. The same information for fish taken in the trapnet at locations 6 and B1 in the upper river is presented in Table 6. Species distribution by location of juvenile and small fish species caught with beach seines and minnow traps is presented in Table 7.

The gillnetting survey showed that Catostomus catostomus (36.7%), Esox lucius (31.0%) and Prosopium cylindraceum (15.1%) were the main species inhabiting the upper river, although C. catostomus was generally absent in the reach below Boyer Lake (Table 2 and 4). As expected, both Coregonus clupeaformis and Salvelinus namaycush were only prevalent in the Lac la Martre stations (loc. 1-5). C. clupeaformis were relatively scarce in the river except in the fall when both coregonid species became more abundant in the river section between Lac la Martre and Boyer Lake (Table 4). While a few Catostomus commersoni were also present, Stizostedion v. vitreum was notably absent in the upper Rivière la Martre. Thymallus arcticus were rarely caught in gillnets; however, the angling data (Table 5) showed that this species was present, especially in rapids and shallow riffle habitats. The trapnet (Table 6) seemed only capable of catching a disproportionate amount of Catostomus catostomus in relation to other species as indicated by the gillnet catches. The three dominant species observed in 1972 in Lac la Martre were C. clupeaformis (58.9%), C. catostomus (20.8%) and S. namaycush (16.9%), (Bond 1973).

The lower Rivière la Martre had some notable differences in its fish distribution and abundance. Coregonus clupeaformis was the most abundant species caught in gillnets (56.7%) followed by Esox lucius (31.0%), Stizostedion v. vitreum (9.1%) and Catostomus commersoni (2.4%) (Table 3). Compared to the upper river, Prosopium cylindraceum, Thymallus arcticus and Catostomus catostomus were scarce. Stizostedion v. vitreum and Esox lucius were the two species taken most successfully by angling. In the spring the S.v. vitreum were readily caught in the immediate vicinity of the two tributaries (loc. 35 and 54). During the rest of the season, this species was distributed in the whole length of the study area, especially at sites that were typically the deepest part of the main channel (e.g. loc. 23 and 28).

CATCH SUMMARIES

Tables 8 and 9 present length, weight and age data on each species caught by the six gillnet mesh sizes used on the upper and lower Rivière la Martre.

TAGGING

In the upper river floy tags were placed on 227 Catostomus catostomus, 166 Thymallus arcticus, 160 Esox lucius, 26 Coregonus clupeaformis, 23 Salvelinus namaycush, 19 Prosopium cylindraceum and 3 Lota lota. Of these there were 6 Esox lucius, 4 Thymallus arcticus, 1 Catostomus catostomus recaptured. Movements were very minor or negligible (Table 10).

In the lower river tags were placed on 138 Stizostedion v. vitreum, 86 Esox lucius, 42 Coregonus clupeaformis and 2 Thymallus arcticus. Of these there were 20 Stizostedion vitreum, 6 Esox lucius and 1 Coregonus clupeaformis recaptured. Five Stizostedion v. vitreum moved upstream during May, June and July. One moved downstream to the creek at Location 54 between May and late June.

AGE AND LENGTH STATISTICS

Data on all aged fish of each species, including those angled, have been combined. Age frequency tables are presented in Appendix 1. Length frequency and age frequency histograms are presented in Appendix 2. The length frequency distribution by age group for each species are summarized in Appendix 3.

SEX AND MATURITY

Age specific sex ratios and maturity are presented in Appendix 4.

LENGTH-WEIGHT REGRESSION

The length-weight relationship for each species by study area are presented in Appendix 5.

FOOD ITEM OCCURRENCE

Occurrence of food items from stomach analysis is presented in Appendix 6.

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Table 1. Scientific and common names of fish captured during the Rivière la Martre study, 1975.

Family and Species	Common Name	Abbreviation
FAMILY SALMONIDAE		
SUBFAMILY SALMONINAE		
Salvelinus namaycush (Walbaum)	Lake trout	LKTR
SUBFAMILY CORIGONINAE		
Coregonus artedii Lesueur	Lake cisco	LKCS
Coregonus clupeaformis (Mitchill)	Lake whitefish	LKWT
Prosopium cylindraceum (Pallas)	Round whitefish	RDWT
SUBFAMILY THYMALLINAE		
Thymallus arcticus (Pallas)	Arctic grayling	ARGR
FAMILY PERCIDAE		
Stizostedion vitreum vitreum (Mitchill)	Yellow walleye	WALL
FAMILY GADIDAE		
Lota lota (Linnaeus)	Burbot	BRBT
FAMILY ESOCIDAE		
Esox lucius Linnaeus	Northern pike	NRPK
FAMILY COTTIDAE		
Cottus cognatus Richardson	Slimy sculpin	SLSC
FAMILY CATOSTOMIDAE		
Catostomus catostomus (Forster)	Longnose sucker	LNSK
Catostomus commersoni (Lacépède)	White sucker	WTSK
FAMILY CYPRINIDAE		
Couesius plumbeus (Agassiz)	Lake chub	LKCH
Notropis hudsonius (Clinton)	Spottail shiner	STSH
FAMILY PERCOPSIDAE		
Percopsis omiscomaycus (Walbaum)	Trout perch	TPCH
FAMILY GASTEROSTEIDAE		
Pungitius pungitius (Linnaeus)	Ninespine stickleback	NSSB

Table 2. Total catch, species distribution and set time by sampling location for fish caught by gillnets, upper Rivière la Martre, 1975.

Location	Species									Total Net Hours by Gear *				
	LKWT	NRPK	LKTR	RDWT	ARGR	WTSK	LNSK	LKCS	LKCH	X	1	3	4	5
1	6			1			5			57				
2	5	1	3				3			28				44
3	12	2	1	12			4	5	1	114				
4	15	4		4			8			68				
5	19	32	8	9			15			96	47	22	119	42
6	7	33		21			10			94	44	28		
7	34	21	11	34	4	1	44			60	100	138		
8	1	2		5			72			28			61	
9		18		3			5					71		
10				3			27			23			25	
B1	3	11		19	1		26			187				
B2		15		8	6		44			88	38		71	
B3		5					5			24				
B4		14		6			17			21		31		
B5		24		1			11			23		25		
B6		14		2			10			19		41		
B7		2					6			23				
11	1	7					13			44		56		
12		14		3						76		22	21	
13		4								52	20			
14		19				1				51		19	21	
15		4		1						41		47		
16		7										51		
17		4				1				41			24	
18		8		2						64			20	
19		2				3				26				
20		7				3				63				
TOTAL	103	274	23	134	11	9	325	5	1	1 411	249	559	362	86
PERCENT	11.6	31.0	2.6	15.1	1.3	1.6	36.7	0.6	0.1					

* Gear Codes:
X 30 m Swedish gang. Six panels, 5 m each. Meshes: 38 mm, 51 mm, 76 mm, 102 mm, 127 mm, 140 mm.
1 23 m standard 25 mm mesh net.
3 23 m standard 76 mm mesh net.
4 23 m standard 102 mm mesh net.
5 23 m standard 127 mm mesh net.

Table 3. Total catch, species distribution and set time by sampling location for fish caught by gillnets, lower Rivière la Martre, 1975.

Location	Species							Total Net Hours by Gear			
	LKWT	NRPK	WALL	RDWT	ARGR	WTSK	LNSK	X	2	3	4
24	31	21	4						24	115	
25	6	2	1	2	1	3				46	89
26		5						18		2	
27	1	2	1						23		
30	73	35	3						70	68	40
31	35	25	10	1		1			70	69	24
33	52	39	4	1		1			45	85	44
35	41	25	13					1	17	95	72
37	1	4							17	39	
38	2										1
39	26	18	6	1		1			76	36	61
42								36			
46	17	9	2			2		13	58	45	38
48	33	17	3			8			34	102	20
49	59	32	17	1		3	1		79	75	30
50	36	17	9	1					19	57	64
52	4								12	12	24
53	36	4	3			1			59	25	41
54	25	26	2						40	110	11
58	1							34			
59	81	29	9			2			60	125	22
61	64	31	13			4		41	62	130	1
TOTAL	624	341	100	7	1	26	1	143	765	1236	582
PERCENT	56.7	31.0	9.1	0.6	0.1	2.4	0.1				

Note:

X 30 m Swedish gang. Six panels, 5 m each. Meshes: 38 mm, 51 mm, 76 mm, 102 mm, 127 mm, 140 mm.
2 23 m standard 51 mm mesh net.
3 23 m standard 76 mm mesh net.
4 23 m standard 102 mm mesh net.

Table 4. Total catch, species distribution and set time by area and biweekly period for fish caught by gillnets, Rivière la Martre, 1975.

Location	Species										Total Net Hours by Gear					
	LKWT	NRPK	LKTR	WALL	RDWT	ARGR	WTSK	LNSK	LKCS	LKCH	X	1	2	3	4	5
Lac la Martre (Locations 1 - 5)																
May 19 - June 1		2	1		1						4				47	
June 2 - June 15	7	25	1									47		22	47	
July 14 - July 27		3			14			15	5	1	100					
July 28 - Aug. 10	16	3			6			9			125					
Aug. 11 - Aug. 24	23	5			4			9			108					
Aug. 25 - Sept 7	4	1	5		1			2			26					68
Sept 8 - Sept 21	7		5												25	18
Total	57	39	12		26			35	5	1	363	47		22	119	86
La Martre R. Section (Locations 6 - 10)																
May 19 - June 1		9			1									25		
June 2 - June 15		24			3			1						28		
June 16 - June 29		16			5			57				100		46	69	
July 14 - July 27		4			3			29			47					
July 28 - Aug. 10	8	3			5			17			70					
Aug. 11 - Aug. 24					4			11			18					
Aug. 25 - Sept 7					16			1			50					
Sept 8 - Sept 21	34	18			29	4	1	42				44		138	17	
Total	42	74			66	4	1	158			185	144		237	86	
Boyer Lake (Locations B1 to B7)																
May 19 - June 1	1	36			26	6		39			153			31	71	
June 2 - June 15	1	35			6			21			65			66		
June 16 - June 29		4										38				
July 14 - July 27		9			2			53			124					
July 28 - Aug. 10	1	1			2	1		6			43					
Total	3	85			36	7		119			385	38		97	71	
Upper la Martre (Locations 11 to 20)																
May 19 - June 1		16			1			1			5			80		
June 16 - June 24	1	31						3				20		115	86	
July 14 - July 27		4					2	4			160					
July 28 - Aug. 10		13			1			5			160					
Aug. 11 - Aug. 24		12			4		6				133					
Total	1	76			6		8	13			458	20		195	86	
Lower la Martre (Locations 21 to 61)																
May 5 - May 18	22	4		1	1								65	55		
May 19 - June 1	56	42		21			14				142		72	180	87	
June 2 - June 15	176	72		51	1	1	7	1			1		156	312	169	
June 16 - June 29	216	100		12	4		1						259	271	134	
June 30 - July 27	49	26												30	16	
July 14 - July 27	4	6												8	1	
July 28 - Aug. 10	64	60		11	1		4						144	312	126	
Aug. 11 - Aug. 24	37	31		4									69	69	48	
Total	624	341		100	7	1	26	1			143		765	1237	581	

Note:

X 30 m Swedish gang. Six panels, 5 m each. Meshes: 38 mm, 51 mm, 76 mm, 102 mm, 127 mm, 140 mm.
1 23 m standard 25 mm mesh net.
2 23 m standard 51 mm mesh net.
3 23 m standard 76 mm mesh net.
4 23 m standard 102 mm mesh net.
5 23 m standard 127 mm mesh net.

Table 5. Total catch, species distribution and sampling duration for fish caught by angling, upper and lower Rivière la Martre, 1975.

Location	Species						Time (hrs)
	LKWT	NRPK	WALL	LKTR	RDWT	ARGR	
Upper River							
2				4			6.0
3		1		8			5.5
5				1			2.5
8						1	1.0
9					1	4	2.5
B_2		3				63	16.0
11						10	2.75
12		1				2	.75
14		2				10	3.0
17		4				3	2.0
19		1					.75
20		11				6	4.25
Total		23		13	1	99	47.00
Lower River							
21		3					1.0
23		3	35				5.25
25		1	2			4	4.75
26		1	2				.5
28		4	20				8.0
29		9	2				3.75
35		5	50				6.75
42		1					1.75
45	1	9	3				7.75
48		1					.25
49		1					.25
53		2					.5
54	1	46	22				13.75
55							.25
57		10					1.0
60		1					.25
E_1		6	3				3.5
Total	2	103	139			4	59.00

Table 6. Total catch, species distribution and sampling duration by date for fish caught by trapnet at locations 6 and B1 in the upper Rivière la Martre, 1975.

Location	Species				Duration hours
	NRPK	LNSK	LKCS	BRBT	
Location B_1					
9/6/75 - 11/6/75	3				49
11/6/75 - 24/6/75	7				310
24/6/75 - 2/7/75	1	41			189.5
2/7/75 (1430-2030hr.)		51			6
2/7/75 - 4/7/75		190			45
Location 6					
22/8/75 - 28/8/75	1	172			140
28/8/75 - 19/9/75	3	101	1		528
19/9/75 - 25/9/75		37		4	144

Table 7. Total catch and species distribution of fish caught with beach seines and minnow traps at locations on the Rivière la Martre in 1975.

| Species | Upper River Locations | | | | | | | | | | Lower River Locations | | | | | | | | | |

Table 8. Catch summary by mesh size for all net sets, upper Rivière la Martre, 1975.

Mesh (mm)	Length (mm)				Weight (g)				Age (years)			
	N	Mean	SD	Range	N	Mean	SD	Range	N	Mean	SD	Range
Coregonus clupeaformis												
38	26	428	74.7	238-543	18	1034	568.8	300-2150	26	5.9	1.6	2- 8
51	16	370	53.5	265-463	14	713	305.3	340-1400	16	4.7	1.1	2- 7
76	34	443	51.3	312-515	22	1138	441.3	380-1950	29	6.0	1.2	4- 9
102	19	448	48.0	363-543	17	1279	490.4	620-2275	19	6.3	1.4	4- 9
127	12	482	54.5	422-587	12	1550	515.7	1050-2450	11	7.2	1.3	6-10
140	2	482	50.9	446-518	2	1625	388.9	1350-1900	2	7.0	0.0	7
Totals	109			238-587	85			300-2400	103			2-10
Esox lucius												
38	42	460	104.0	259-714	21	758	600.5	120-2750	36	5.6	1.8	2-10
51	20	463	101.5	270-697	14	608	283.8	160-1025	13	6.0	2.3	3-11
76	154	521	74.1	343-883	79	1042	394.1	320-2625	129	6.5	1.9	4-14
102	38	623	91.6	464-870	23	2027	977.4	780-4700	30	8.5	2.1	5-14
127	13	571	151.0	442-1010	13	1723	2379.8	575-9500	13	7.3	2.9	5-15
140	3	724	177.2	530-877	2	3950	1343.5	3000-4900	3	10.3	2.1	8-12
Totals	270			259-1010	152			120-9500	224			2-15
Salvelinus namaycush												
38	4	551	53.5	494-623	1	1600	-	-	0	-	-	-
76	8	527	60.4	423-620	4	1488	284.0	1300-1900	0	-	-	-
102	6	545	63.1	475-655	4	2113	657.5	1450-3000	0	-	-	-
127	4	552	19.3	532-572	2	1875	106.1	1800-1950	0	-	-	-
Totals	22			423-655	11			1300-3000	0			-
Prosopium cylindraceum												
38	15	398	72.6	173-488	13	779	355.6	60-1400	15	6.1	1.9	1- 9
51	27	417	34.0	362-498	25	831	214.4	560-1500	27	6.7	1.4	5-10
76	62	425	33.4	360-498	58	861	193.2	540-1250	61	7.1	1.3	5-10
102	19	452	22.0	421-506	11	1006	123.0	850-1300	17	7.9	0.8	7-10
Totals	123			173-506	107			60-1500	120			1-10
Thymallus arcticus												
76	1	402	-	-	0	-	-	-	1	4.0	-	-
102	5	393	36.2	344-443	1	1300	-	-	5	3.8	0.8	3- 5
127	1	465	-	-	1	1400	-	-	1	7.0	-	-
Totals	7			344-465	2			1300-1400	7			3- 7
Coregonus artedii												
38	5	140	33.8	100-192	1	80	-	-	5	2.2	0.8	1- 3
Catostomus commersoni												
38	1	197	-	-	1	120	-	-	0	-	-	-
76	2	432	91.2	367-496	1	2100	-	-	0	-	-	-
102	1	417	-	-	1	1150		-	0	-	-	-
127	4	488	53.8	440-565	4	1788	193.1	1600-2000	0	-	-	-
140	1	453	-	-	1	1750	-	-	0	-	-	-
Total	9			197-565	7			1150-2100	0			-
Catostomus catostomus												
38	13	414	25.2	371-448	7	1113	130.4	940-1250	0	-	-	-
51	18	400	45.8	290-464	16	921	293.4	300-1350	1	5.0	-	-
76	74	406	31.4	335-483	42	1002	266.2	470-1550	0	-	-	-
102	160	420	21.5	370-484	63	1111	198.7	710-1575	0	-	-	-
127	31	431	20.2	386-470	29	1261	180.0	1000-1700	0	-	-	-
140	9	444	31.9	403-505	9	1361	287.0	1050-2000	0	-	-	-
Totals	305			290-505	166			300-2000	1			-
Couesius plumbeus												
38	1	53	-	-	0	-	-	-	0	-	-	-

Table 9. Catch summary by mesh size for all net sets, lower Rivière la Martre, 1975.

Mesh (mm)	Length (mm)				Weight (g)				Age (years)			
	N	Mean	SD	Range	N	Mean	SD	Range	N	Mean	SD	Range
Coregonus clupeaformis												
51	166	366	37.2	283-515	166	649	229.6	270-1750	164	6.7	1.1	4- 9
76	340	369	29.8	296-476	341	647	200.9	290-1550	338	6.6	1.1	4-10
102	110	398	28.9	330-510	110	831	217.4	360-1750	110	7.4	1.0	5-10
127	1	430	-	-	1	1000	-	-	1	8.0	-	-
Totals	617			283-515	618			170-1750	613			4-10
Esox lucius												
38	1	440	-	-	1	580	-	-	1	6.0	-	-
51	79	495	133.3	279-926	79	1147	1295.4	170-7200	75	5.1	2.0	1-12
76	241	559	110.3	345-1055	241	1513	1561.8	320-11700	239	6.2	1.7	3-14
102	25	683	104.8	517-879	25	2749	1508.3	1000-6050	22	7.5	1.7	5-12
127	1	572	-	-	1	1300	-	-	1	6.0	-	-
Totals	347			279-1055	347			170-11700	338			1-14
Stizostedion vitreum												
51	26	374	46.4	280-437	26	520	183.7	200-820	25	7.4	2.1	3-11
76	58	402	24.2	335-467	58	627	149.1	0-940	57	8.5	1.4	6-13
102	19	430	27.8	378-503	19	831	168.7	650-1375	17	9.3	1.1	8-12
Totals	103			280-503	103			200-1375	99			3-13
Prosopium cylindraceum												
76	2	444	16.3	432-455	2	1110	198.0	970-1250	2	12.0	1.4	11-13
102	4	425	21.1	403-450	4	1059	189.7	810-1250	4	8.0	0.8	7- 9
Totals	6			403-455	6			810-1250	6			7-13
Thymallus arcticus												
102	1	404	-	-	1	710	-	-	0	-	-	-
Catostomus commersoni												
51	2	275	29.0	254-295	2	315	134.4	220-410	1	6.0	-	-
76	4	421	31.0	380-453	4	1083	233.6	750-1280	0	-	-	-
102	17	435	34.5	370-503	17	1311	301.5	860-1850	0	-	-	-
Totals	23			254-503	23			220-1850	1	-	-	6
Catostomus catostomus												
76	1	394	-	-	1	660	-	-	0	-	-	-

Table 10. Location and date of capture and recapture of fish tagged on the Rivière la Martre, 1975.

Tag Number	Species	Date Capture	Date Recapture	Capture Location	Recapture Location	Distance From Release Site (km)
Upper River						
CO 1979	NRPK	20-5-75	24-6-75	14	14	0
CO 1984	ARGR	23-5-75	22-9-75	9	7	.3
CO 1901	NRPK	26-5-75	26-6-75	18	18	0
CO 1903	NRPK	26-5-75	2705-75	B1	B2	1.5
CO 1913	NRPK	26-5-75	27-5-75	B3	B3	0
CO 1950	NRPK	27-5-75	28-5-75	B4	B4	0
CO 2002	ARGR	1-6-75	27-6-75	B1	B2	1.5
CO 2005	LNSK	2-6-75	3-6-75	B1	B1	0
CO 2057	NRPK	11-6-75	15-7-75	5	5	0
CO 2118	ARGR	16-6-75	18-6-75	B2	B2	0
CO 2159	ARGR	18-6-75	27-6-75	2	2	0
Lower River						
CO 2502	LKWT	15-5-75	13-6-75	50	50	0
CO 2519	WALL	17-5-75	6-6-75	54	35	9
CO 2524	WALL	17-5-75	24-6-75	54	31	11
CO 2530	WALL	24-5-75	6-6-75	35	35	0
CO 2531	WALL	24-5-75	6-6-75	35	35	0
CO 2533	WALL	24-5-75	15-7-75	35	28	3.5
CO 2545	WALL	2-6-75	11-6-75	35	35	0
CO 2547	WALL	2-6-75	30-7-75	35	39	1
CO 2556	WALL	2-6-75	7-6-75	35	35	0
CO 2560	WALL	6-6-75	29-7-75	35	23	7
CO 2568	WALL	6-6-75	7-6-75	35	35	0
CO 2572	WALL	6-6-75	10-6-75	35	35	0
CO 2578	WALL	6-6-75	7-6-75	35	35	0
CO 2595	NRPK	8-6-75	11-6-75	29	31	1
CO 2607	WALL	10-6-75	15-7-75	35	28	3
CO 2609	WALL	10-6-75	15-7-75	35	28	3
CO 2617	NRPK	11-7-75	6-8-75	24	24	0
CO 2648	NRPK	7-7-75	13-8-75	54	54	0
CO 2683	NRPK	11-7-75	30-7-75	54	54	0
CO 2693	WALL	14-7-75	29-7-75	25	26	.7
CO 2694	NRPK	14-7-75	15-8-75	26	30	1.5
CO 2703	WALL	15-7-75	28-7-75	28	28	0
CO 2707	WALL	16-7-75	5-8-75	28	28	0
CO 2707	WALL	16-7-75	28-7-75	28	28	0
CO 2730	WALL	29-7-75	14-8-75	23	23	0
CO 2736	WALL	29-7-75	5-8-75	23	23	0
CO 2742	NRPK	30-7-75	13-8-75	54	54	0

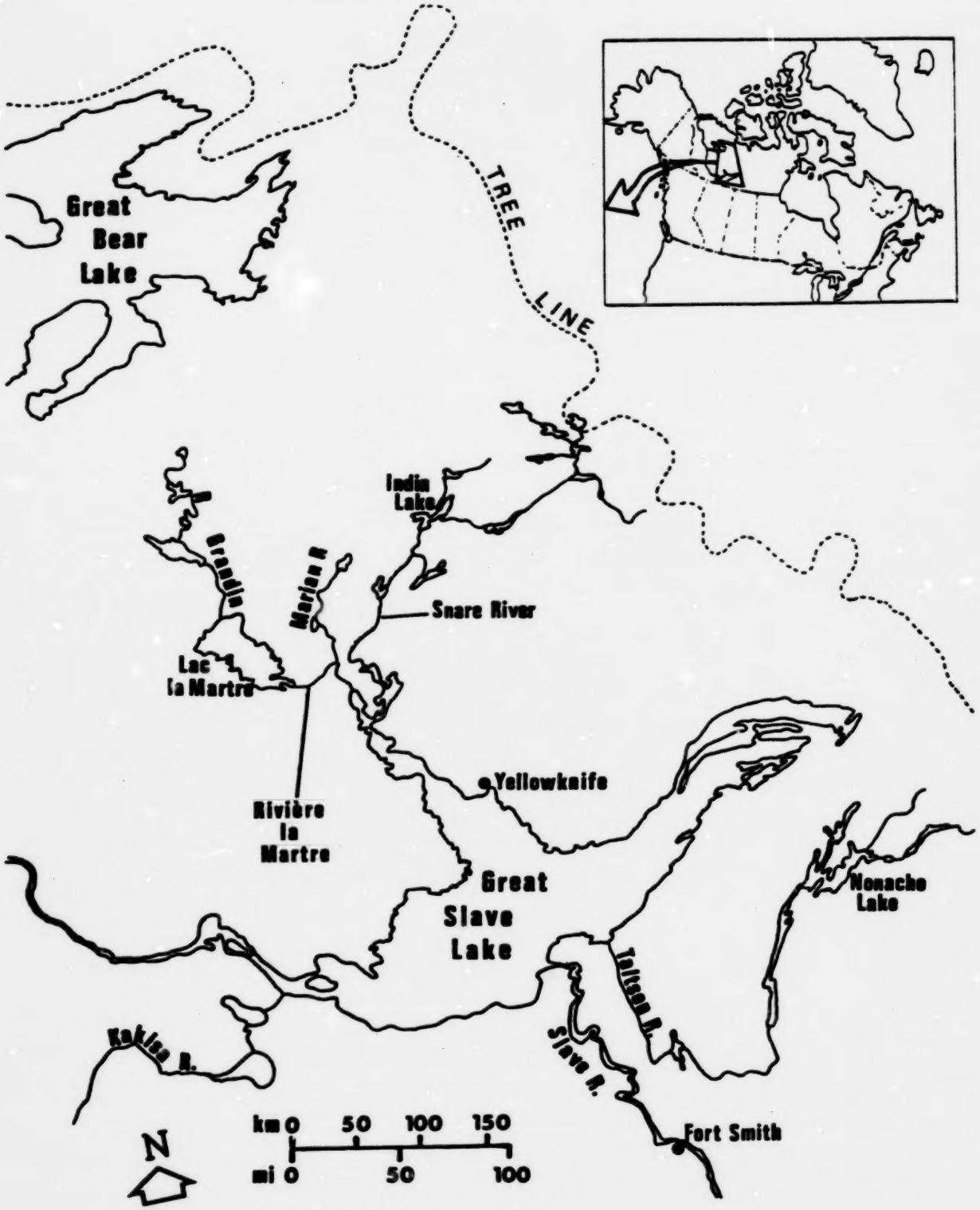

Fig. 1. Location of the Rivière la Martre drainage.

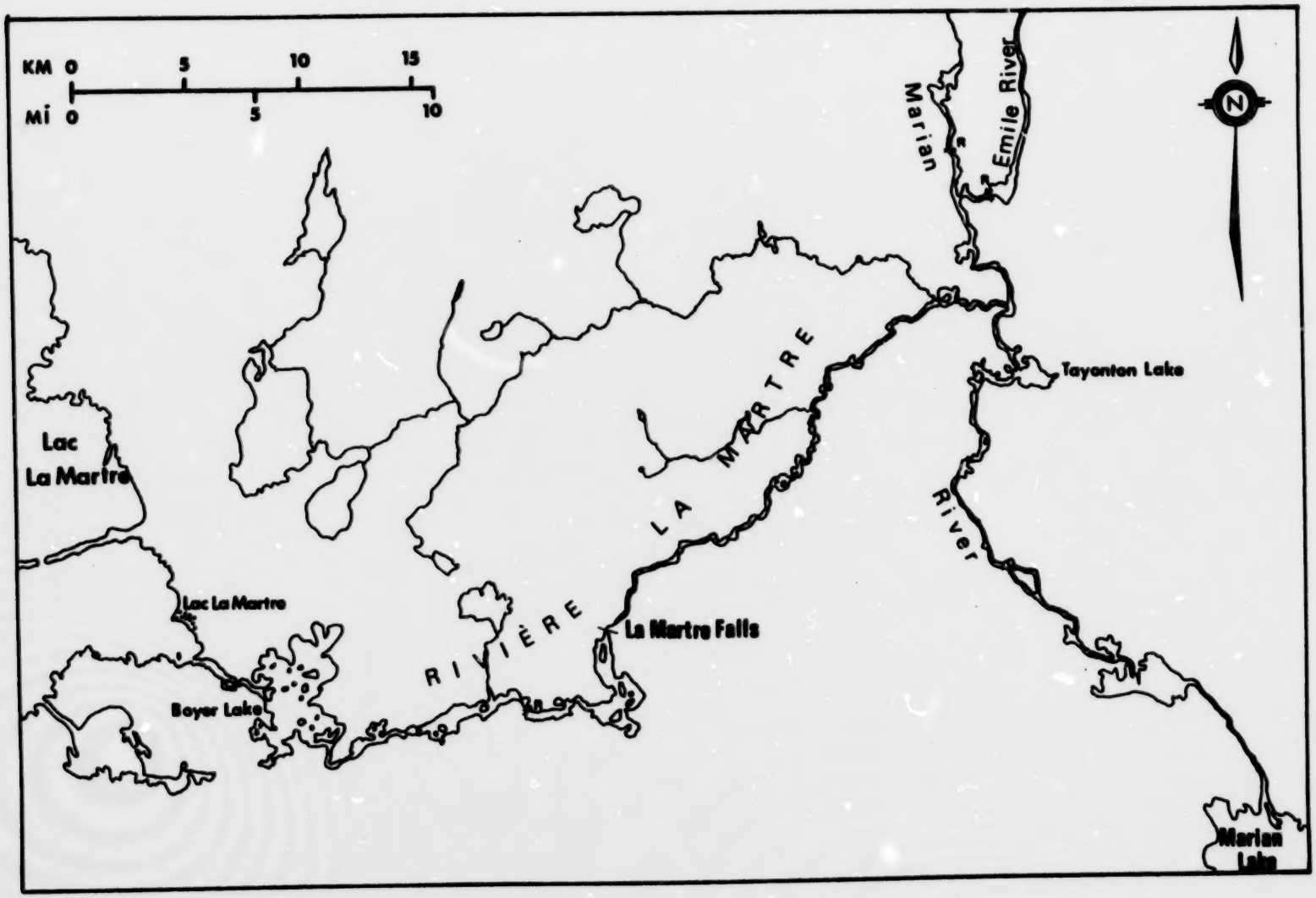

Fig. 2. The Rivière la Martre study area.

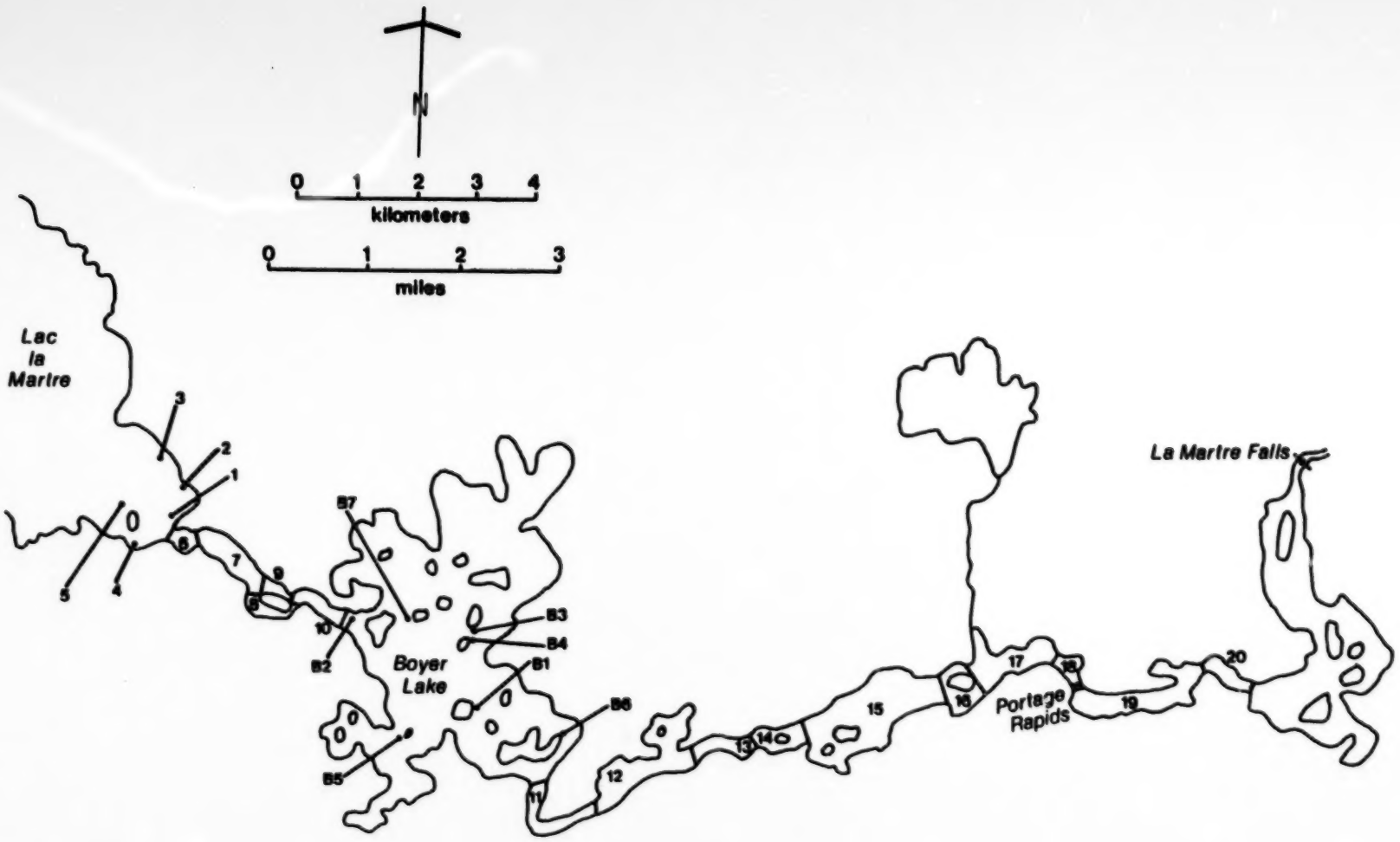

Fig. 3. Sampling locations on the upper Rivière la Martre, 1975.

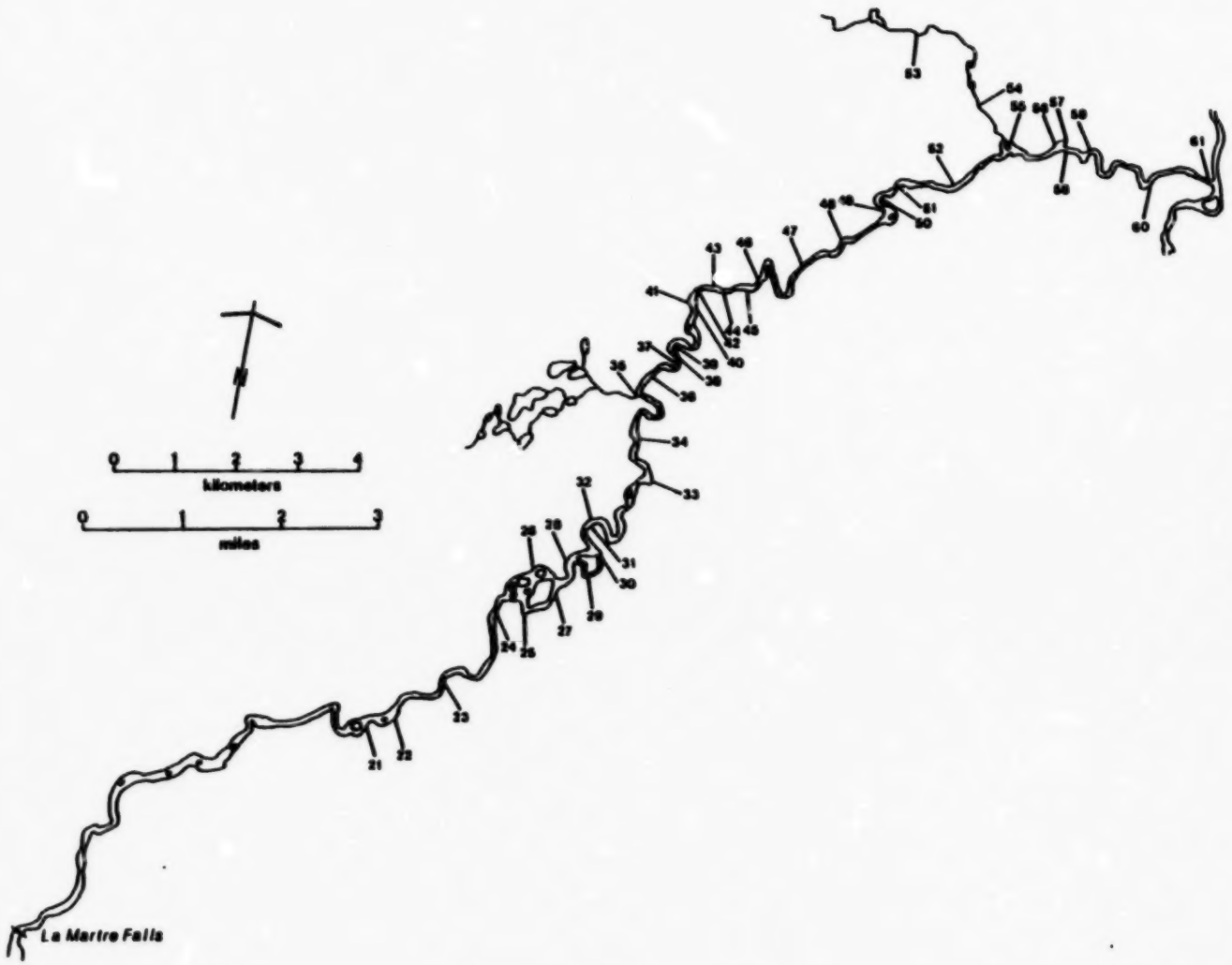

Fig. 4. Sampling locations on the lower Rivière la Martre, 1975.

APPENDIX 1

Age frequency data and condition for
fish caught in the Rivière la Martre
1975

Table A1.1 Coregonus clupeaformis, lower River

Table A1.2 Coregonus clupeaformis, upper River

Table A1.3 Esox lucius, lower River

Table A1.4 Esox lucius, upper River

Table A1.5 Prosopium cylindraceum, lower River

Table A1.6 Prosopium cylindraceum, upper River

Table A1.7 Stizostedion vitreum vitreum, lower River

Table A1.8 Thymallus arcticus, upper River

Table A1.9 Coregonus artedii, upper River

Table A1.1. Age frequency data and condition for Coregonus clupeaformis, lower Rivière la Martre, 1975.

Scale Age	Males					Females					Sex unknown				Combined			
	N	Mean Length	SD	Range	k	N	Mean Length	SD	Range	k	N	Mean Length	SD	Range	N	Mean Length	SD	Range
4	1	297			1.22	1	333			1.16					2	315	25.5	297-333
5	47	345	20.9	296-412	1.21	31	348	31.4	283-447	1.22	7	335	34.4	295-395	85	345	26.2	283-447
6	80	358	25.5	291-430	1.26	72	356	21.8	304-418	1.28	6	344	27.9	317-380	158	357	23.9	291-430
7	101	382	24.8	320-454	1.31	92	378	30.0	306-450	1.30	11	370	33.3	314-418	204	379	27.7	306-454
8	51	388	28.1	318-439	1.31	67	392.2	27.6	330-476	1.27	12	392	24.2	349-441	130	391	27.4	318-476
9	13	406	29.4	338-462	1.32	15	431.7	42.2	369-515	1.34	3	413	6.4	409-420	31	419	36.7	338-515
10	2	421	2.12	419-422	1.28	3	450.7	32.3	414-475	1.42					5	439	28.2	414-475
Total	295			291-462		281			283-515		39			295-441	615			283-515

Table A1.2. Age frequency data and condition for Coregonus clupeaformis, upper Rivière la Martre, 1975.

Scale Age	Males					Females					Sex unknown				Combined			
	N	Mean Length	SD	Range	k	N	Mean Length	SD	Range	k	N	Mean Length	SD	Range	N	Mean Length	SD	Range
2											2	252	19.1	238-265	2	252	19.1	238-265
3	2	296	23.3	279-312	1.42										2	296	23.3	279-312
4	4	334	31.9	312-380	1.27	4	355	52.6	297-420	1.09	2	358	71.4	307-408	10	347	44.2	297-420
5	10	389	24.1	351-434	1.37	10	407	26.9	382-461	1.25	5	416	52.1	335-461	25	402	32.6	335-461
6	17	439	21.1	405-497	1.34	3	440	16.7	421-453	1.33	6	464	18.7	447-488	26	445	22.3	405-497
7	11	475	34.4	438-543	1.42	9	468	38.8	407-507	1.45	7	471	17.8	446-495	27	472	31.6	407-543
8	1	486			1.57	4	532	12.0	519-548	1.50	1	510			6	521	21.2	486-548
9	1	482				3	506	32.2	483-543	1.47					4	500	28.9	482-543
10						1	531			1.47					1	531		
Total	46			279-543		34			297-548		23			238-510	103			238-548

Table A1.3. Age frequency data and condition for Esox lucius, lower Rivière la Martre, 1975.

Scale Age	Males					Females					Sex unknown				Combined			
	N	Mean Length	SD	Range	k	N	Mean Length	SD	Range	k	N	Mean Length	SD	Range	N	Mean Length	SD	Range
1						1	299			0.67	1	258			2	279	29.0	258-299
2	3	324	9.5	314-333	0.67	4	330	61.7	279-413	0.74					7	327	44.1	279-413
3	7	402	71.7	286-489	0.73						2	401	120.9	315-486	9	402	75.4	286-489
4	15	450	66.1	345-551	0.78	16	466	61.4	359-552	0.73	12	498	51.9	401-558	43	470	62.3	345-558
5	28	487	49.7	382-596	0.71	48	536	54.6	440-689	0.70	39	508	41.3	426-594	115	515	52.7	382-689
6	33	522	63.2	371-772	0.79	57	550	64.8	345-774	0.73	39	537	51.9	440-687	129	539	61.4	345-774
7	13	540	54.9	444-625	0.69	21	594	83.1	485-786	0.71	12	594	75.6	505-745	46	579	76.7	444-786
8	8	607	65.7	528-675	0.72	21	640	84.5	529-836	0.75	7	650	105.4	491-762	36	634	84.2	491-836
9	4	638	146.0	534-847	0.73	12	711	129.1	417-919	1.09	1	845			17	702	133.5	417-919
10	1	490			0.67	1	724			0.84	3	746	152.2	590-894	5	690	155.6	490-894
11						3	967	46.2	918-1010	0.99					3	967	46.2	918-1010
12						5	857	37.0	810-894	0.86					5	857	37.0	810-894
13											2	1005	63.6	960-1050	2	1005	63.6	960-1050
14						1	1055			0.92					1	1055		
Total	112			286-847		190			279-1055		118			258-1055	420			258-1050

Table A1.4. Age frequency data and condition for Esox lucius, upper Rivière la Martre, 1975.

Scale Age	Males					Females					Sex unknown				Combined			
	N	Mean Length	SD	Range	k	N	Mean Length	SD	Range	k	N	Mean Length	SD	Range	N	Mean Length	SD	Range
2											3	277	21.5	259-301	3	277	21.5	259-301
3	2	331	21.9	315-346	0.69	2	327	37.5	300-353	0.77	2	355	14.2	345-365	6	337	24.7	300-365
4	3	384	18.8	362-395	0.86	4	415	9.1	407-428	0.76	8	427	60.8	343-523	15	415	47.1	343-523
5	16	465	18.5	431-497	0.74	8	460	33.1	397-511	0.77	33	471	31.8	382-531	57	468	28.7	382-531
6	14	496	23.4	449-536	0.73	8	499	40.8	407-542	0.83	27	509	39.7	442-595	49	504	35.8	407-595
7	11	518	33.2	462-565	0.75	19	553	46.8	412-653	0.78	25	543	40.1	497-645	55	541	42.5	412-653
8	7	543	35.62	486-589	0.77	7	583	82.9	495-745	0.68	18	583	49.0	535-737	32	574	56.4	486-745
9	7	593	26.4	567-637	0.82	4	652	33.2	627-701	0.65	6	674	64.9	578-764	17	635	56.6	567-764
10	2	581	55.2	542-620	0.96	3	685	28.1	658-714	0.74	2	676	31.1	654-698	7	653	57.9	542-714
11	3	677	24.4	650-697	0.70	1	766			0.67	3	752	143.9	640-914	7	722	94.1	640-914
12	1	727				1	877			0.73	1	766			3	790	77.8	727-877
13	1	805			0.59	2	764	65.1	718-810	0.75	1	1010			4	836	123.6	718-1010
14	1	870			0.71						1	883			2	877	9.2	870-883
15						1	1010			0.92					1	1010		
Total	68			315-870		60			300-1010		130			259-1010	258			259-1010

Table A1.5. Age frequency data and condition for Prosopium cylindraceum, lower Rivière la Martre, 1975.

Scale Age	Males N	Mean Length	SD	Range	k	Females N	Mean Length	SD	Range	k	Sex unknown N	Mean Length	SD	Range	Combined N	Mean Length	SD	Range
7						1	403			1.24					1	403		
8	1	412			1.47	1	450			1.37					2	431	26.9	412-450
9	1	433			1.42										1	433		
11						1	432			1.20					1	432		
13	1	455			1.33										1	455		
Total	3			412-455		3			403-450						6			403-455

Table A1.6. Age frequency data and condition for Prosopium cylindraceum, upper Rivière la Martre, 1975.

Scale Age	Males N	Mean Length	SD	Range	k	Females N	Mean Length	SD	Range	k	Sex unknown N	Mean Length	SD	Range	Combined N	Mean Length	SD	Range
1											1	173			1	173		
5	8	371	9.9	362-390	1.16	8	386	18.8	360-423	1.18					16	378	16.5	360-423
6	23	393	15.3	371-420	1.13	5	394	16.5	378-419	1.21	2	408	2.1	406-409	30	394	15.1	371-420
7	18	426	21.1	385-488	1.09	7	421	8.4	407-434	1.14	2	444	3.5	441-446	27	426	18.4	385-488
8	22	445	8.7	431-458	1.14	6	451	16.9	423-475	1.06	8	462	13.0	442-486	36	450	13.0	423-486
9	5	454	19.2	437-477	1.22	4	470	13.5	456-488	1.03	3	474	27.8	456-506	12	464	20.2	437-506
10						3	476	25.5	448-498	1.25					3	476	25.5	448-498
Total	76			362-488		33			360-498		16			173-506	125			173-506

Table A1.7. Age frequency data and condition for Stizostedion vitreum vitreum, lower Rivière la Martre, 1975.

Scale Age	Males					Females					Sex unknown				Combined			
	N	Mean Length	SD	Range	k	N	Mean Length	SD	Range	k	N	Mean Length	SD	Range	N	Mean Length	SD	Range
3											1	280			1	280		
5	3	320	24.8	293-342	0.91	3	329	11.8	316-339	0.93	8	315	19.7	288-337	14	319	18.9	288-342
6	4	356	16.1	342-378	0.93	1	362			1.03	10	349	19.6	305-380	15	352	17.9	305-380
7	5	376	29.5	335-409	0.93	12	384	20.7	334-417	1.00	19	377	29.8	326-426	36	379	26.5	326-426
8	11	409	17.1	380-438	1.01	12	405	17.0	370-434	0.94	24	389	24.4	347-428	47	398	22.6	347-438
9	13	408	20.0	375-438	1.05	16	410	18.8	380-450	0.97	27	400	25.2	339-440	56	405	22.4	339-450
10	6	412	18.4	380-436	1.04	7	428	18.8	392-450	0.95	19	412	26.4	377-489	32	415	23.9	377-489
11						3	416	34.6	383-452	0.92	5	424	8.8	412-434	8	421	20.1	393-452
12						1	503			1.08					1	503		
13											1	467			1	467		
Total	42			293-438		55			316-503		114			280-489	211			280-503

Table A1.8. Age frequency data and condition for Thymallus arcticus, upper Rivière la Martre, 1975.

Scale Age	Males N	Males Mean Length	Males SD	Males Range	Males k	Females N	Females Mean Length	Females SD	Females Range	Females k	Sex unknown N	Sex unknown Mean Length	Sex unknown SD	Sex unknown Range	Combined N	Combined Mean Length	Combined SD	Combined Range
2																		
3	1	412			1.47	1	403			1.24					1	403		
4	1	433			1.42	1	450			1.37					2	431	26.9	412-450
5															1	433		
6	1	455			1.33	1	432			1.20					1	432		
7															1	455		
Total	3			412-455		3			403-450						6			403-455

Table A1.9. Age frequency data and condition for Coregonus artedii, upper Rivière la Martre, 1975.

Scale Age	Males N	Males Mean Length	Males SD	Males Range	Males k	Females N	Females Mean Length	Females SD	Females Range	Females k	Sex unknown N	Sex unknown Mean Length	Sex unknown SD	Sex unknown Range	Combined N	Combined Mean Length	Combined SD	Combined Range
1																		
2											1	100			1	100		
3						1	192				2	142	9.2	135-148	2	142	9.2	135-148
											1	127			2	150	46.0	127-192
Total						1	192				4			100-148	5			100-192

APPENDIX 2

Length-frequency and age-frequency histograms by area for fish caught in the Rivière la Martre, 1975

Figure A2.1 Length frequency, *Coregonus clupeaformis*

Figure A2.2 Length frequency, *Esox lucius*

Figure A2.3 Length frequency, *Prosopium cylindraceum*

Figure A2.4 Length frequency, *Catostomus commersoni*

Figure A2.5 Length frequency, *Stizostedion vitreum vitreum* and *Thymallus arcticus*

Figure A2.6 Length frequency, *Salvelinus namaycush* and *Catostomus catostomus*

Figure A2.7 Age frequency, *Coregonus clupeaformis*

Figure A2.8 Age frequency, *Esox lucius*

Figure A2.9 Age frequency, *Prosopium cylindraceum*

Figure A2.10 Age frequency, *Stizostedion vitreum vitreum* and *Thymallus arcticus*

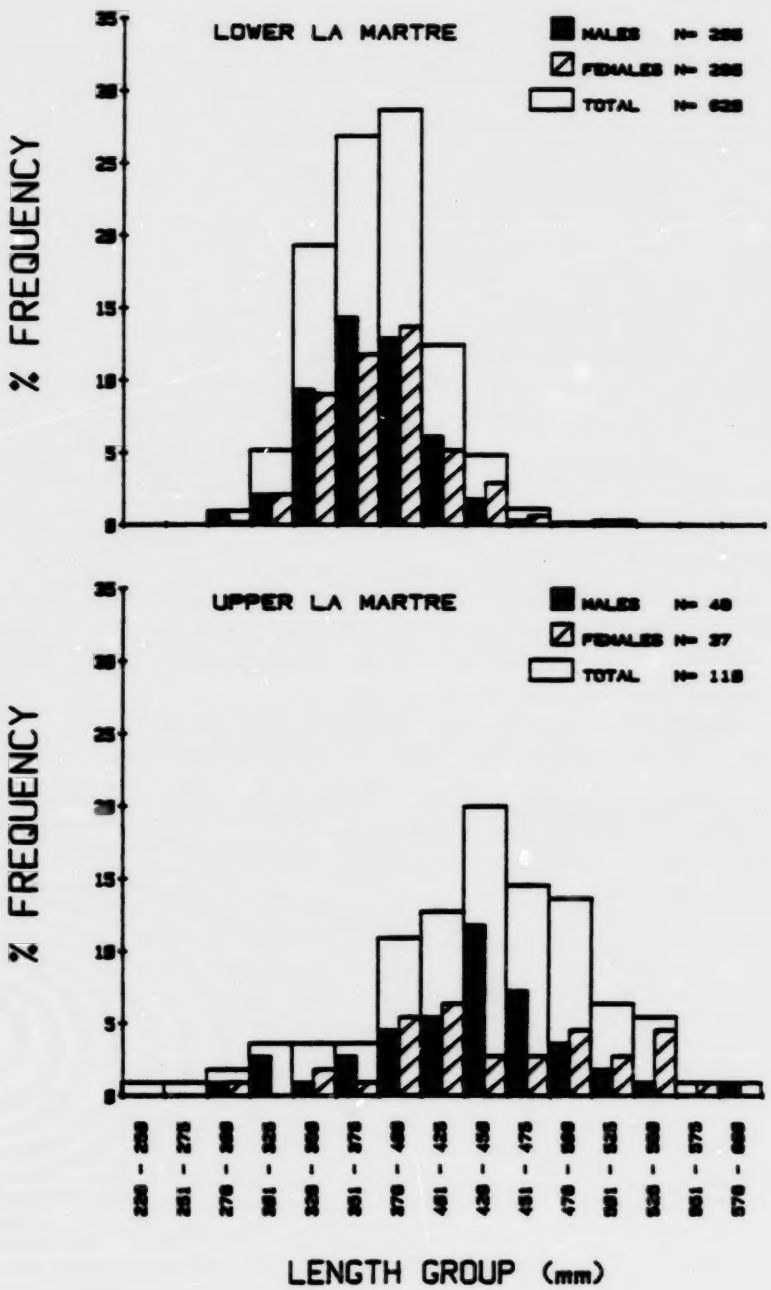

Fig. A2.1. Length frequency by area of *Coregonus clupeaformis* caught in the Rivière la Martre, 1975.

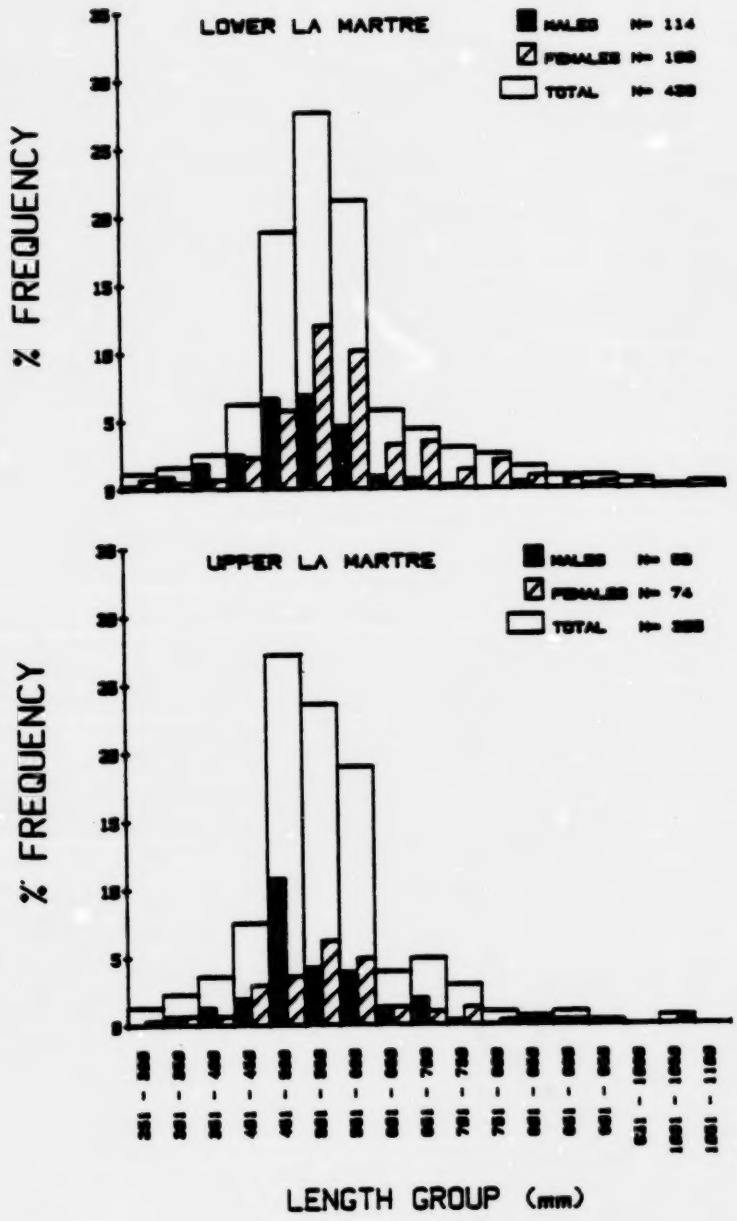

Fig. A2.2. Length frequency by area of *Esox lucius* caught in the Rivière la Martre, 1975.

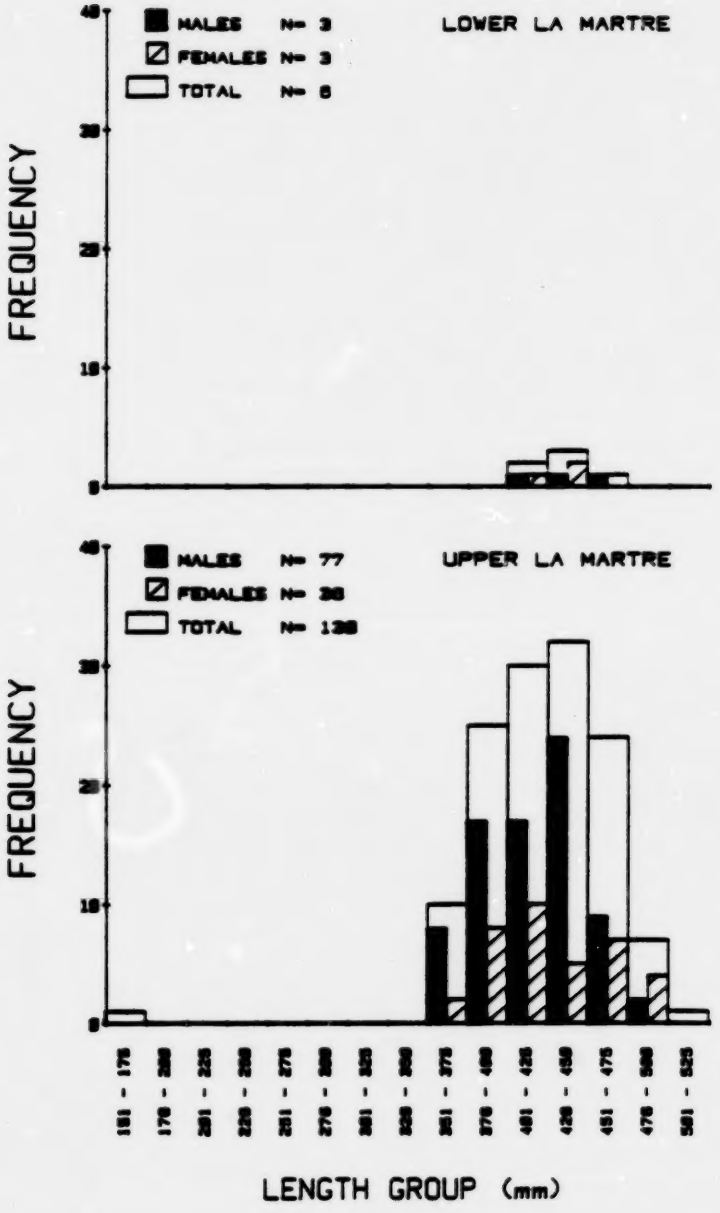

Fig. A2.3. Length frequency by area of *Prosopium cylindraceum* caught in the Rivière la Martre, 1975.

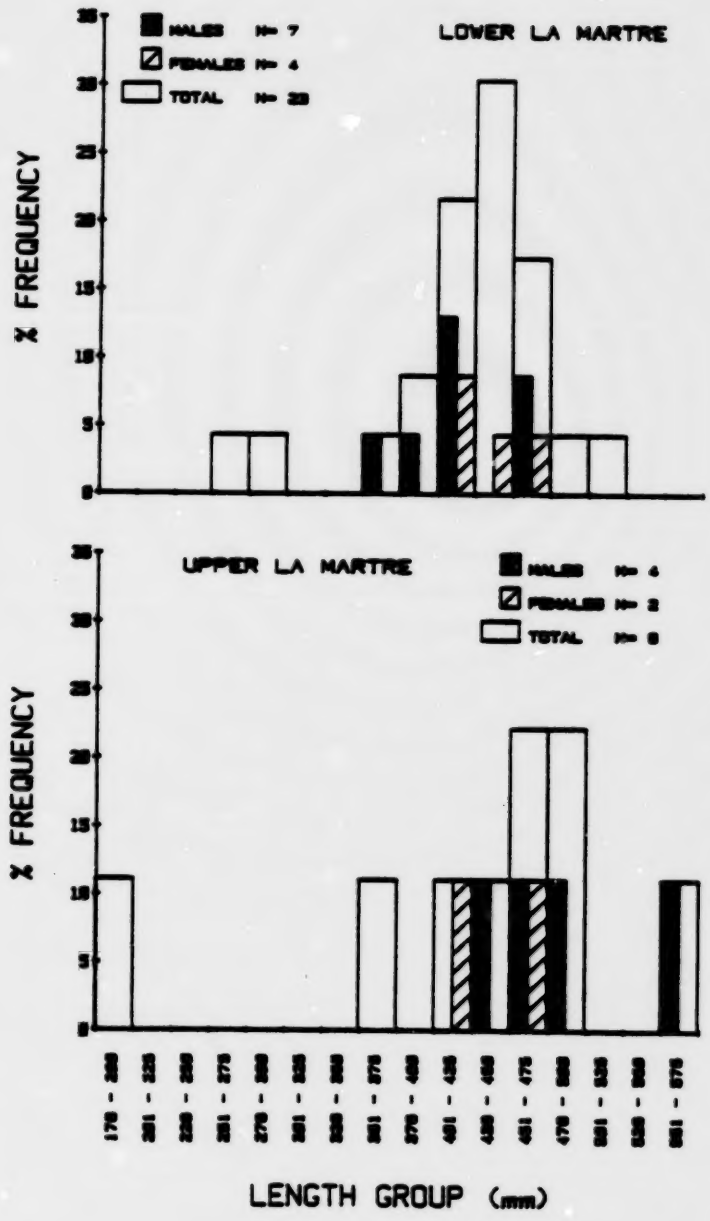

Fig. A2.4. Length frequency by area of *Catostomus commersoni* caught in the Rivière la Martre, 1975.

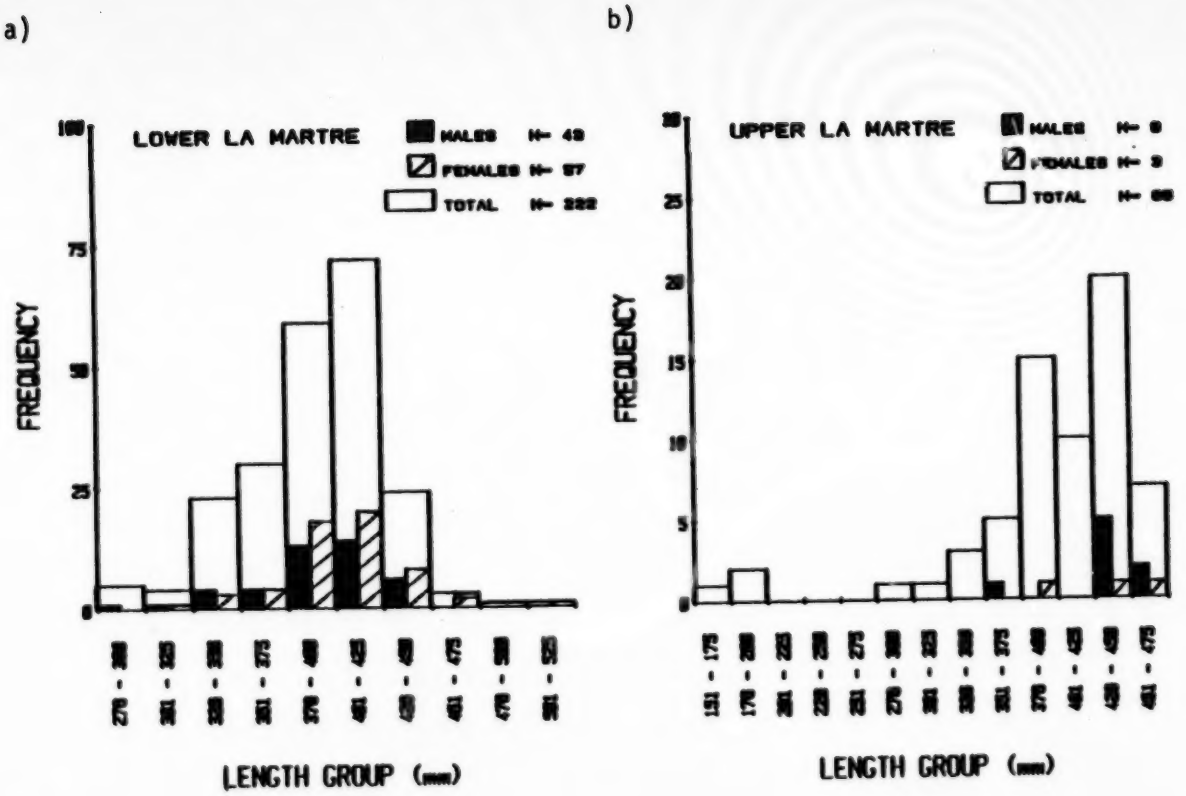

Fig. A2.5. Length frequency by area of a) *Stizostedion vitreum vitreum* and b) *Thymallus arcticus* caught in the Rivière la Martre, 1975.

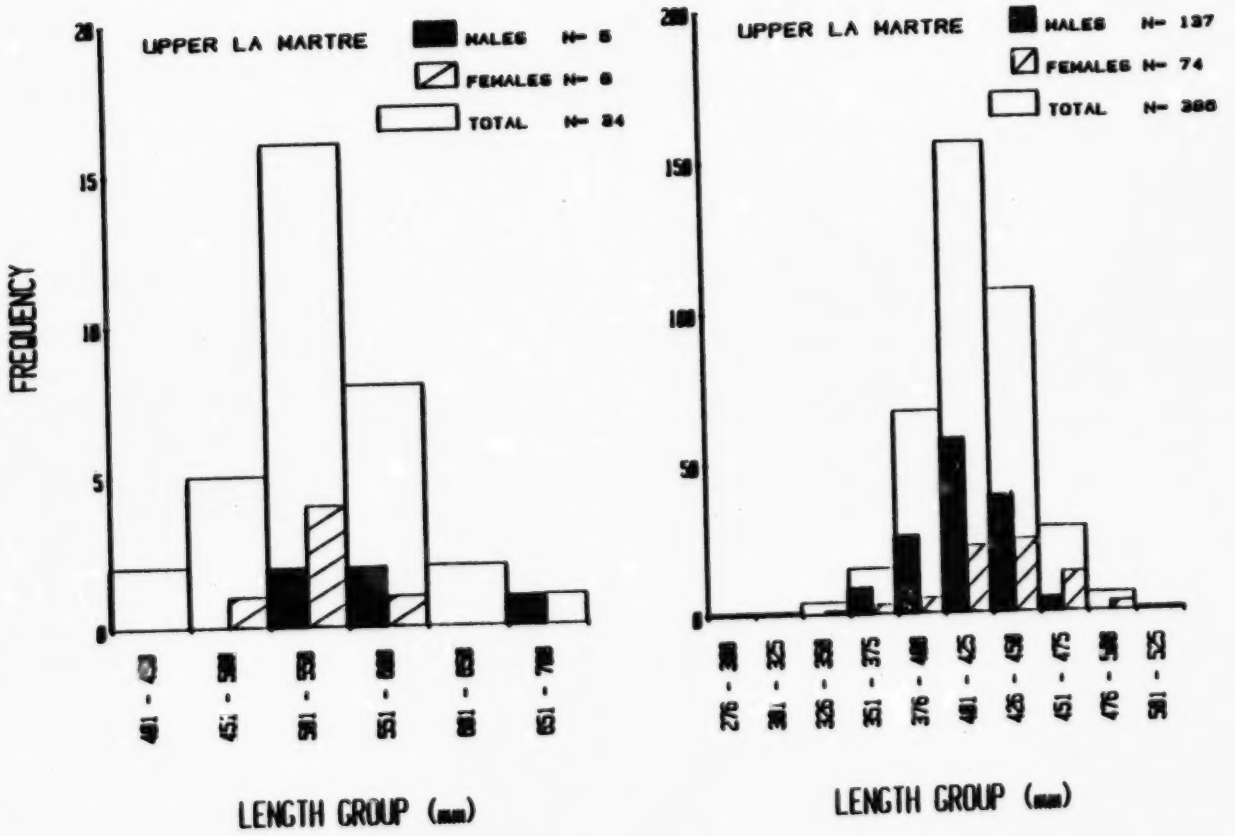

Fig. A2.6. Length frequency by area of a) *Salvelinus namaycush* and b) *Catostomus catostomus* caught in the Rivière la Martre, 1975.

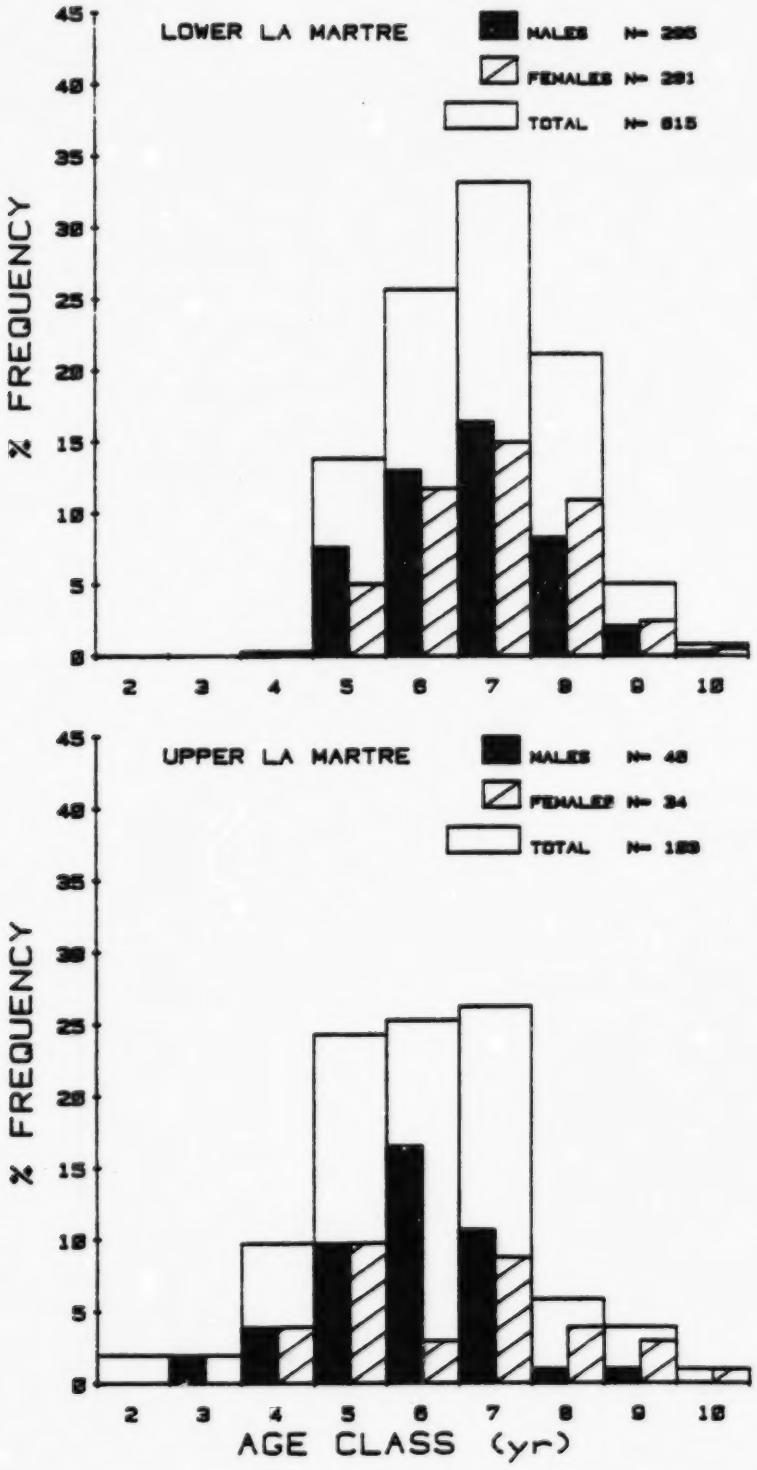

Fig. A2.7. Age frequency by area of *Coregonus clupeaformis* caught in the Rivière la Martre, 1975.

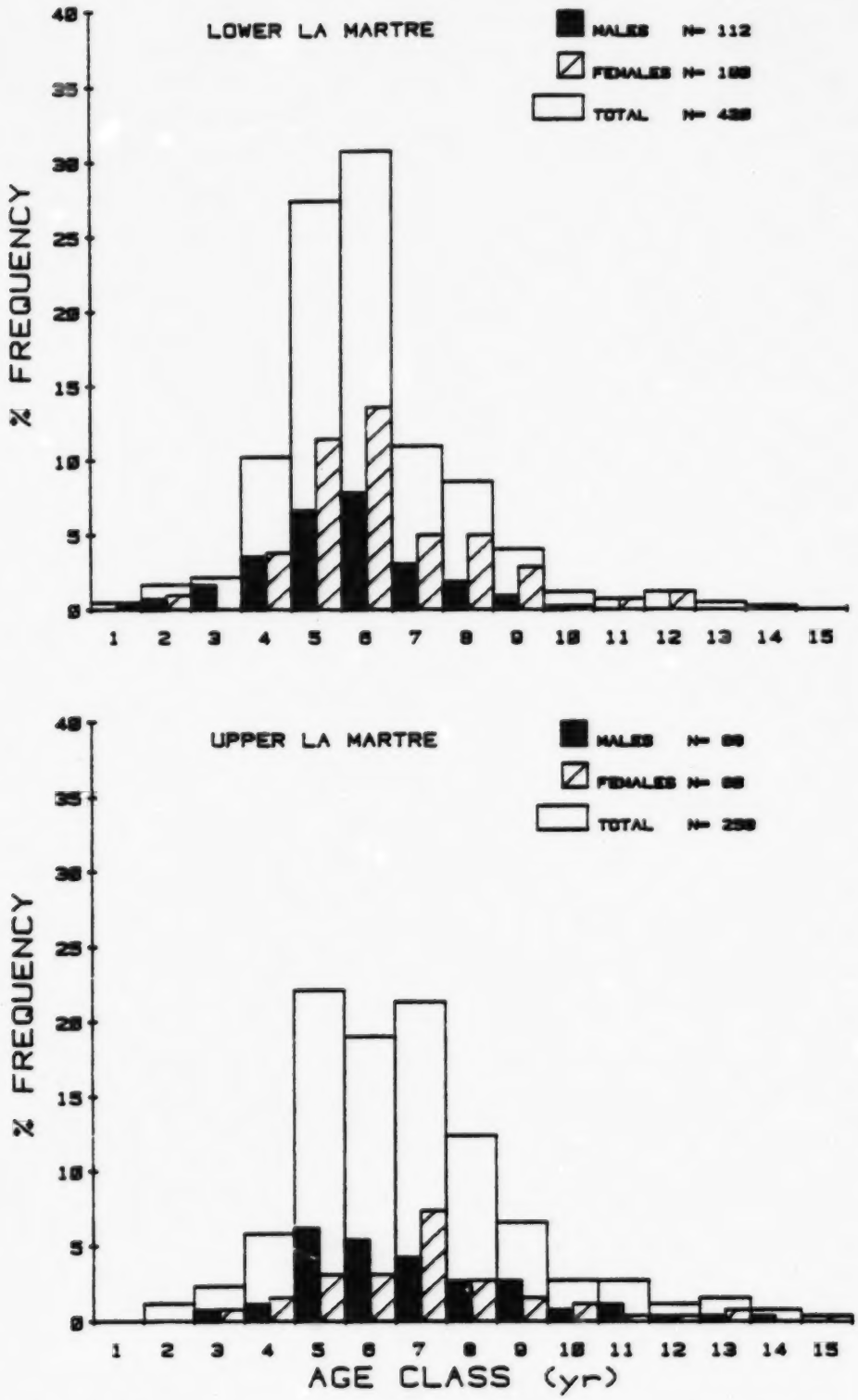
LOWER LA MARTRE
MALES N= 112
FEMALES N= 188
TOTAL N= 438
% FREQUENCY
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
UPPER LA MARTRE
MALES N= 69
FEMALES N= 68
TOTAL N= 258
% FREQUENCY
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
AGE CLASS (yr)

Fig. A2.8. Age frequency by area of *Esox lucius* caught in the Rivière la Martre, 1975.

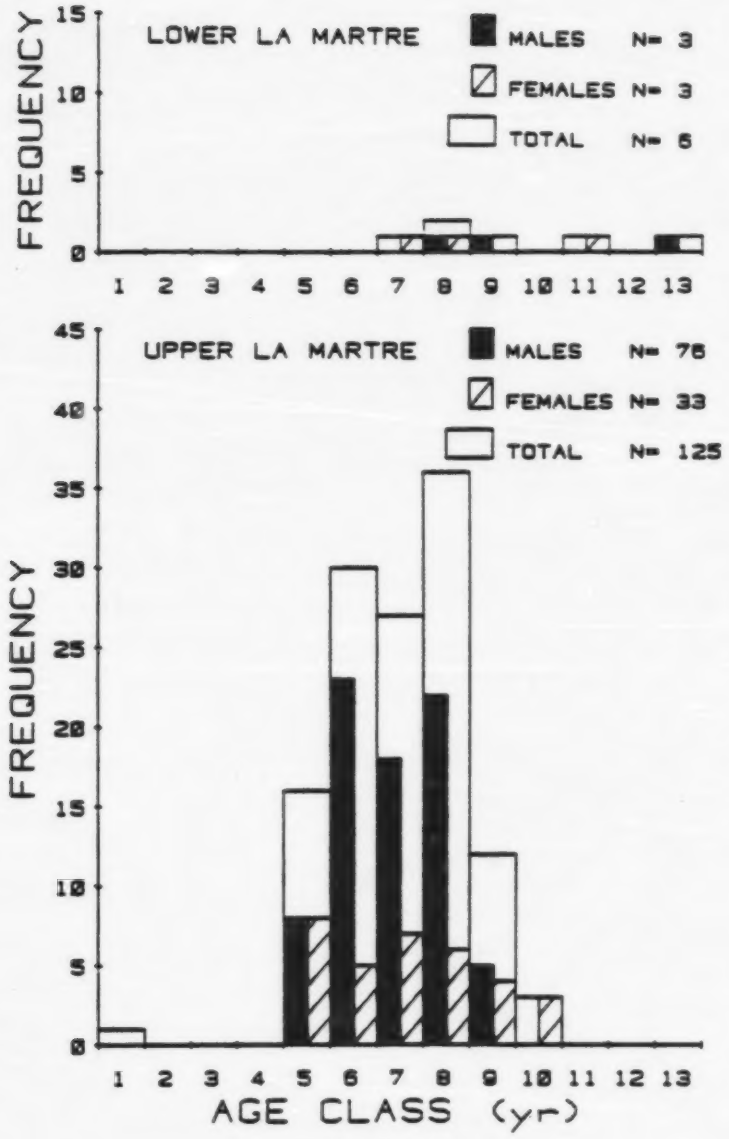

Fig. A2.9. Age frequency by area of *Prosopium cylindraceum* caught in the Rivière la Martre, 1975.

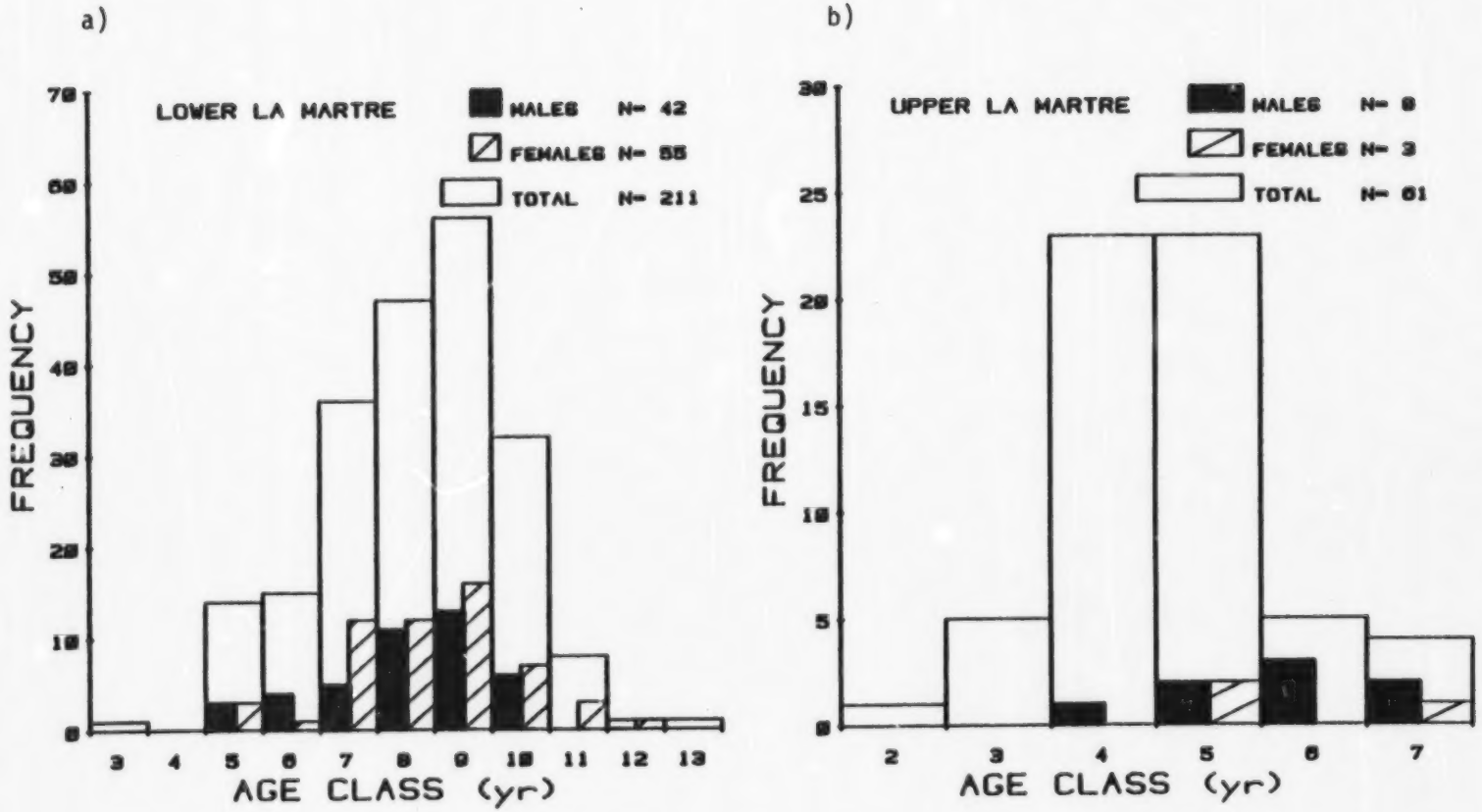

Fig. A2.10. Age frequency by area of a) *Stizostedion vitreum vitreum* and b) *Thymallus arcticus* caught in the Rivière la Martre, 1975.

APPENDIX 3

Length frequency distribution by age group for fish caught in the Rivière la Martre, 1975

Table A3.1 Coregonus clupeaformis, lower River

Table A3.2 Coregonus clupeaformis, upper River

Table A3.3 Esox lucius, lower River

Table A3.4 Esox lucius, upper River

Table A3.5 Prospium clyindraceum, upper River

Table A3.6 Stizostedion vitreum vitreum, lower River

Table A3.7 Stizostedion vitreum vitreum, upper River

Table A3.1. Length frequency distribution by age group for all Coregonus clupeaformis captured in the lower Rivière la Martre, 1975.

Fork Length (mm)	Scale Age (yr)										TOTAL
	1	2	3	4	5	6	7	8	9	10	
1 - 25											
26 - 50											
51 - 75											
76 - 100											
101 - 125											
126 - 150											
151 - 175											
176 - 200											
201 - 225											
226 - 250											
251 - 275											
276 - 300				1	3	2					6
301 - 325					13	13	5	1			32
326 - 350				1	37	46	25	9	1		119
351 - 375					24	64	54	23	1		166
376 - 400					5	29	79	59	6		178
401 - 425					2	3	30	23	14	3	75
426 - 450					1	1	10	14	4		30
451 - 475							1		3	2	6
476 - 500								1			1
501 - 525									2		2
526 - 550											
551 - 575											
576 - 600											
TOTAL				2	85	158	204	130	31	5	615

Table A3.2. Length frequency distribution by age group for all Coregonus clupeaformis captured in the upper Rivière la Martre, 1975.

Fork Length (mm)	Scale Age (yr)										TOTAL
	1	2	3	4	5	6	7	8	9	10	
1 - 25											
26 - 50											
51 - 75											
76 - 100											
101 - 125											
126 - 150											
151 - 175											
176 - 200											
201 - 225											
226 - 250		1									1
251 - 275		1									1
276 - 300			1	1							2
301 - 325			1	3							4
326 - 350				2	1						3
351 - 375				1	3						4
376 - 400				1	10						11
401 - 425				2	5	5	2				14
426 - 450					4	13	5				22
451 - 475					2	5	9				16
476 - 500						3	6	1	3		13
501 - 525							4	2			6
526 - 550							1	3	1	1	6
551 - 575											
576 - 600											
TOTAL		2	2	10	25	26	27	6	4	1	103

Table A3.3. Length frequency distribution by age group for all Esox lucius captured in the upper Rivière la Martre, 1975.

Fork Length (mm)	Scale Age (yr)															TOTAL
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
1 - 50																
51 - 100																
101 - 150																
151 - 200																
201 - 250																
251 - 300		2														2
301 - 350		1	4	1												6
351 - 400			2	5	2											9
401 - 450				5	10	3	1									19
451 - 500				3	38	21	7	2								71
501 - 550				1	7	20	23	8		1						60
551 - 600						5	21	18	6							50
601 - 650							2	1	6	1	1					11
651 - 700							1	1	2	4	3					11
701 - 750								2	2	1	1	1	1			8
751 - 800									1		1	1				3
801 - 850													2			2
851 - 900												1		2		3
901 - 950											1					1
951 - 1000																
1001 - 1050													1		1	2
1051 - 1100																
TOTAL		3	6	15	57	49	55	32	17	7	7	3	4	2	1	258

Table A3.4. Length frequency distribution by age group for all Esox lucius captured in the lower Rivière la Martre, 1975.

Fork Length (mm)	Scale Age (yr)														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	TOTAL
1 - 50															
51 - 100															
101 - 150															
151 - 200															
201 - 250															
251 - 300	2	2	1												5
301 - 350		4	1	1		1									7
351 - 400			2	6	1	2									11
401 - 450		1	2	7	11	3	1		1						26
451 - 500			3	12	33	27	5	1		1					82
501 - 550				13	46	41	10	7	2						119
551 - 600				4	19	43	17	4	1	1					89
601 - 650					2	7	7	8	1						25
651 - 700					3	3	1	8	4						19
701 - 750						1	3	3	2	1					10
751 - 800						1	2	4	2	1					10
801 - 850								1	3			2			6
851 - 900										1		3			4
901 - 950									1		1				2
951 - 1000											1		1		2
1001 - 1050											1				1
1051 - 1100													1	1	2
TOTAL	2	7	9	43	115	129	46	36	17	5	3	5	2	1	420

Table A3.5. Length frequency distribution by age group for all *Prosopium cylindraceum* captured in the upper Rivière la Martre, 1975.

Fork Length (mm)	Scale Age (yr)										TOTAL
	1	2	3	4	5	6	7	8	9	10	
1 - 25											
26 - 50											
51 - 75											
76 - 100											
101 - 125											
126 - 150											
151 - 175	1										1
176 - 200											
201 - 225											
226 - 250											
251 - 275											
276 - 300											
301 - 325											
326 - 350											
351 - 375					8	2					10
376 - 400					7	17	1				25
401 - 425					1	11	16	1			29
426 - 450							9	17	3	1	30
451 - 475								17	6		23
476 - 500							1	1	2	2	6
501 - 525									1		1
526 - 550											
551 - 575											
576 - 600											
TOTAL		1			16	30	27	36	12	3	125

Table A3.6. Length frequency distribution by age group for all *Stizostedion vitreum vitreum* captured in the lower Rivière la Martre, 1975.

Fork Length (mm)	Scale Age (yr)													TOTAL
	1	2	3	4	5	6	7	8	9	10	11	12	13	
1 - 25														
26 - 50														
51 - 75														
76 - 100														
101 - 125														
126 - 150														
151 - 175														
176 - 200														
201 - 225														
226 - 250														
251 - 275														
276 - 300			1		4									5
301 - 325					3	1								4
326 - 350					7	7	5	2	1					22
351 - 375						5	12	7	4					28
376 - 400						2	12	13	19	9				55
401 - 425							6	21	23	14	1			65
426 - 450							1	4	9	8	4			26
451 - 475											2		1	3
476 - 500										1	1			2
501 - 525												1		1
526 - 550														
551 - 575														
576 - 600														
TOTAL			1		14	15	36	47	56	32	8	1	1	211

Table A3.7. Length frequency distribution by age group for all Thymallus arcticus captured in the upper Rivière la Martre, 1975.

Fork Length (mm)	Scale Age (yr)							TOTAL
	1	2	3	4	5	6	7	
1 - 25								
26 - 50								
51 - 75								
76 - 100								
101 - 125								
126 - 150								
151 - 175								
176 - 200								
201 - 225								
226 - 250								
251 - 275								
276 - 300		1						1
301 - 325			1					1
326 - 350			3					3
351 - 375				5				5
376 - 400			1	9	5			15
401 - 425				6	4			10
426 - 450				1	13	5		19
451 - 475				2	1		4	7
476 - 500								
501 - 525								
526 - 550								
551 - 575								
576 - 600								
TOTAL		1	5	23	23	5	4	61

APPENDIX 4

Age specific sex ratios and maturity tables by area for fish caught in the Rivière la Martre, 1977

Table A4.1 Coregonus clupeaformis, lower River

Table A4.2 Coregonus clupeaformis, upper River

Table A4.3 Esox lucius, lower River

Table A4.4 Esox lucius, upper River

Table A4.5 Prosopium cylindraceum, lower River

Table A4.6 Prosopium cylindraceum, upper River

Table A4.7 Stizostedion vitreum vitreum, lower River

Table A4.8 Thymallus arcticus, upper River

Table A4.1. Age specific sex ratios and maturity for Coregonus clupeaformis, lower Rivière la Martre, 1975.

Age (years)	Females			Males			Females and Males			F/M ratio	Unsexed	Total	
	N	%	% mature	N	%	% mature	N	(%)	% mature		N	N	(%)
4	1	50	0	1	50	0	2	(0.4)	0	1.0		2	(0.4)
5	31	40	77	47	60	40	78	(15.2)	55	0.7	4	80	(14.9)
6	72	47	71	80	53	46	152	(29.6)	58	0.9	2	154	(28.7)
7	91	47	79	101	53	57	192	(37.4)	68	0.9	5	197	(36.8)
8	65	56	85	52	44	50	117	(22.8)	69	1.3	9	126	(23.5)
9	15	54	93	13	46	46	28	(5.5)	71	1.2	2	30	(5.6)
10	3	60	100	2	40	100	5	(1.0)	100	1.5		5	(0.9)
Total	278	54	79	296	46	50	514	(100.)	71	0.9	22	536	(100.)

Table A4.2. Age specific sex ratios and maturity for Coregonus clupeaformis, upper Rivière la Martre, 1975.

Age (years)	Females			Males			Females and Males			F/M ratio	Unsexed	Total	
	N	%	% mature	N	%	% mature	N	(%)	% mature		N	N	(%)
2											2	2	(2.1)
3				2	100	0	2	(2.5)	0			2	(2.1)
4	4	50	0	4	50	0	8	(10.0)	0	1.0	2	10	(10.6)
5	10	50	0	10	50	10	20	(25.0)	5	1.0	4	24	(25.5)
6	3	15	0	17	85	47	20	(25.0)	40	0.2	2	22	(23.4)
7	9	45	78	11	55	82	20	(25.0)	80	0.8	3	23	(24.5)
8	4	80	100	1	20	100	5	(6.3)	100	4.0	1	6	(6.4)
9	3	75	100	1	25	100	4	(5.0)	100	3.0		4	(4.3)
10	1	100	100				1	(1.3)	100			1	(1.1)
Total	34	43	44	46	57	44	80	(100.)	44	0.7	14	94	(100.)

Table A4.3. Age specific sex ratios and maturity for Esox lucius, lower Rivière la Martre, 1975.

Age (years)	Females			Males			Females and Males			F/M	Unsexed	Total	
	N	%	% mature	N	%	% mature	N	(%)	% mature	ratio	N	N	(%)
1	1	100	0				1	(0.3)	0		1	2	(0.5)
2	4	57	0	3	43	33	7	(2.3)	14	1.3		7	(1.8)
3				6	100	33	6	(2.0)	33		1	7	(1.8)
4	15	50	33	15	50	0	30	(10.0)	17	1.0	8	38	(9.8)
5	48	63	23	28	37	36	76	(25.3)	28	1.7	26	102	(26.4)
6	57	63	26	33	37	39	90	30.0)	32	1.7	29	119	(30.8)
7	21	62	29	13	38	16	34	(11.3)	24	1.6	10	44	(11.4)
8	21	72	24	8	28	13	29	(9.7)	21	2.6	7	36	(9.3)
9	12	75	17	4	25	25	16	(5.3)	19	3.0	1	17	(4.4)
10	1	50	0	1	50	0	2	(0.7)	0	1.0	2	4	(1.0)
11	3	100	67				3	(1.0)	67			3	(0.8)
12	5	100	20				5	(1.7)	20			5	(1.3)
13											1	1	(0.3)
14	1	100	100				1	(0.3)	100			1	(0.3)
Total	189	63	25	111	37	30	300	(100.)	26	1.7	86	386	(100.)

Table A4.4. Age specific sex ratios and maturity for Esox lucius, upper Rivière la Martre, 1975.

Age (years)	Females			Males			Females and Males			F/M	Unsexed	Total	
	N	%	% mature	N	%	% mature	N	(%)	% mature	ratio	N	N	(%)
2											2	2	(1.3)
3	2	50	0	2	50	0	4	(3.1)	0	1.0	2	6	(4.0)
4	4	57	0	3	43	0	7	(5.5)	0	1.3	8	15	(9.9)
5	8	33	0	16	67	13	24	(18.8)	8	0.5	28	52	(34.4)
6	8	36	0	14	64	36	22	(17.2)	23	0.6	25	47	(31.1)
7	19	63	5	11	37	37	30	(23.4)	17	1.7	26	56	(37.1)
8	7	50	14	7	50	43	14	(10.9)	29	1.0	18	32	(21.2)
9	4	37	0	7	63	43	11	(8.6)	27	0.6	6	17	(11.3)
10	3	60	0	2	40	50	5	(3.9)	20	1.5	2	7	(4.6)
11	1	25	0	3	75	67	4	(3.1)	50	0.3	3	7	(4.6)
12	1	50	0	1	50	100	2	(1.6)	50	1.0	1	3	(2.0)
13	2	67	0	1	33	0	3	(2.3)	0	2.0	1	4	(2.7)
14				1	100	0	1	(0.8)	0		1	2	(1.3)
15	1	100	0				1	(0.8)	0			1	(0.7)
Total	60	47	3	68	53	31	128	(100.)	18	0.9	123	151	(100.)

Table A4.5. Age specific sex ratios and maturity for Prosopium cylindraceum, lower Rivière la Martre, 1975.

Age (years)	Females			Males			Females and Males			F/M ratio	Unsexed	Total	
	N	%	% mature	N	%	% mature	N	(%)	% mature		N	N	(%)
7	1	100	100				1	(16.7)	100			1	(16.7)
8	1	50	100	1	50	100	2	(33.3)	100	1.0		2	(33.3)
9				1	100	100	1	(16.7)	100			1	(16.7)
11	1	100	100				1	(16.7)	100			1	(16.7)
13				1	100	100	1	(16.7)	100			1	(16.7)
Total	3	50	100	3	50	100	6		100	1.0		6	(100.)

Table A4.6. Age specific sex ratios and maturity for Prosopium cylindraceum, upper Rivière la Martre, 1975.

Age (years)	Females			Males			Females and Males			F/M ratio	Unsexed	Total	
	N	%	% mature	N	%	% mature	N	(%)	% mature		N	N	(%)
1											1	1	(0.8)
5	8	50	88	8	50	50	16	(14.7)	69	1.0	1	17	(14.2)
6	5	18	100	23	82	70	28	(25.7)	75	0.2		28	(23.3)
7	7	28	71	18	72	44	25	(22.9)	52	0.4	1	26	(21.7)
8	6	21	17	22	79	64	28	(25.7)	54	0.3	6	34	(28.3)
9	4	44	75	5	56	60	9	(8.3)	67	0.8	2	11	(9.2)
10	3	100	33				3	(2.8)	33			3	(2.5)
Total	33	30	67	76	70	59	109	(100.)	62	0.4	11	120	(100.)

Table A4.7. Age specific sex ratios and maturity for Stizostedion vitreum vitreum, lower Rivière la Martre, 1975.

Age (years)	Females			Males			Females and Males			F/M ratio	Unsexed	Total	
	N	%	% mature	N	%	% mature	N	(%)	% mature		N	N	(%)
3											1	1	(0.6)
5	3	50	67	3	50	67	6	(6.2)	67	1.0	5	11	(6.0)
6	1	20	100	4	80	50	5	(5.2)	60	0.3	8	13	(7.1)
7	12	71	67	5	29	60	17	(17.5)	65	2.4	11	28	(15.4)
8	12	52	58	11	48	64	23	(23.7)	61	1.1	21	44	(24.2)
9	16	55	69	13	45	39	29	(30.0)	55	1.2	20	49	(26.9)
10	7	54	71	6	46	50	13	(13.4)	62	1.2	15	28	(15.4)
11	3	100	100				3	(3.1)	100		3	6	(3.3)
12	1	100	0				1	(1.0)	0			1	(0.6)
13											1	1	(0.6)
Total	55	57	67	42	43	52	97	(100.)	61	1.3	85	182	(100.)

Table A4.8. Age specific sex ratios and maturity for Thymallus arcticus, upper Rivière la Martre, 1975.

Age (years)	Females			Males			Females and Males			F/M ratio	Unsexed	Total	
	N	%	% mature	N	%	% mature	N	(%)	% mature		N	N	(%)
3													
4				1	100	0	1	(10.0)	0		6	6	(8.7)
5	2	50	50	2	50	50	4	(40.0)	50	1.0	26	27	(39.1)
6				3	100	67	3	(30.0)	67		22	26	(37.7)
7				2	100	50	2	(20.0)	50		4	7	(10.1)
											1	3	(4.4)
Total	2	20	50	8	80	50	10	(100.)	50	0.2	59	69	(100.)

APPENDIX 5

Length-weight regressions for fish in the Rivière la Martre, 1975

Table A5.1 Upper River

Table A5.2 Lower River

Table A5.1. Length-weight regressions for fish in the upper Rivière la Martre, 1975.

Species		n	Length Range (mm)	Slope (b)	y-intercept (a)	SDb
Coregonus clupeaformis:						
	Males	46	279-587	2.84	-4.46	0.34
	Females	36	297-564	3.33	-5.74	0.52
	All[1]	86	238-587	2.78	-4.28	0.29
Esox lucius:						
	Males	74	315-870	2.90	-4.85	0.29
	Females	73	270-1010	2.85	-4.71	0.26
	All[1]	155	259-1010	2.91	-4.90	0.16
Prosopium cylindraceum:						
	Males	77	362-488	2.87	-4.62	0.30
	Females	36	360-498	2.62	-3.96	0.55
	All[1]	114	173-498	2.88	-4.64	0.19
Catostomus catostomus:						
	Males	94	351-457	2.88	-4.50	0.45
	Females	70	290-505	3.16	-5.26	0.26
	All[1]	166	290-505	3.07	-5.02	0.23
Thymallus arcticus:						
	Males	8	373-469	-	-	-
	Females	2	399-442	-	-	-
	All[1]	10	379-469	2.45	-3.45	2.12
Salvelinus namaycush:						
	Males	5	519-655	-	-	-
	Females	6	470-568	-	-	-
	All[1]	14	470-655	2.56	-3.77	1.35

[1] All includes unsexed fish.

Table A5.2. Length-weight regressions for fish in the lower Rivière la Martre, 1975.

Species	n	Length Range (mm)	Slope (b)	y-intercept (a)	SDb
Coregonus clupeaformis:					
Males	295	291-462	3.23	-5.48	0.18
Females	285	283-515	2.99	-4.88	0.23
All[1]	614	283-515	3.12	-5.21	0.14
Esox lucius:					
Males	114	286-926	2.85	-4.73	0.24
Females	196	279-1055	3.19	-5.66	0.21
All[1]	432	258-1055	3.07	-5.33	0.12
Prosopium cylindraceum:					
Males	3	412-455	-	-	-
Females	3	403-450	-	-	-
All[1]	6	403-455	3.15	-5.28	2.11
Stizostedion vitreum vitreum					
Males	43	293-438	3.45	-6.16	0.33
Females	57	316-503	2.94	-4.85	0.42
All[1]	222	280-503	2.88	-4.69	0.19
Catostomus catostomus					
Males	7	370-461	-	-	-
Females	4	402-463	-	-	-
All[1]	23	254-503	3.04	-4.98	0.31

[1] All includes unsexed fish.

APPENDIX 6

Frequency and percent occurrence of food items
by species and area for the
Rivière la Martre, 1975

Table A6.1 Coregonus clupeaformis, upper and lower River

Table A6.2 Esox lucius, upper and lower River

Table A6.3 Prosopium cylindraceum, upper and lower River

Table A6.4 Thymallus arcticus, upper River

Table A6.5 Stizostedion vitreum vitreum, lower River

Table A6.6 Salvelinus namaycush, upper River

Table A6.1. Frequency and percent occurrence of food items in Coregonus clupeaformis from Rivière la Martre, 1975.

Food Item or Parasite	Occurrence			
	Lower River		Upper River	
	N	%	N	%
Insecta				
Diptera				
Chironomidae larvae	32	6.6	5	7.1
Unidentified larvae	5	1.0	2	2.9
Odonata nymph	2	0.4		
Trichoptera larvae	23	4.8	2	2.9
Ephemeroptera nymphs	58	12.0		
Plecoptera nymphs	1	0.2		
Hemiptera				
Corixidae	8	1.7	2	2.9
Coelenterata larvae	5	1.0		
Crustacea				
Amphipoda	36	7.4	32	45.7
Conchostraca	3	0.6		
Mollusca				
Pelecypoda	29	6.0		
Gastropoda	52	10.7	6	8.9
Annelida				
Hirudinea	4	0.8		
Nematoda			2	2.9
Unidentified invertebrates	15	3.1		
Plant Material	15	3.1	2	2.9
Surface food items				
Terrestrial insects	2	0.4		
No. stomachs with food	199	41.1	40	57.1
No. stomachs examined	484		70	

Table A6.2. Frequency and percent occurrence of food items in *Esox lucius* from Rivière la Martre, 1975.

Food Item or Parasite	Occurrence			
	Lower River		Upper River	
	N	%	N	%
Insecta				
Diptera				
Chironomidae larvae			5	3.6
Unidentified adults			1	0.7
Odonata nymphs	32	10.9	5	3.6
Trichoptera larvae	1	0.3	7	5.1
Ephemeroptera nymphs	6	2.0	1	0.7
Plecoptera nymphs	3	1.0	1	0.7
Hemiptera				
Corixidae			2	1.5
Coleoptera adults	1	0.3		
Crustacea				
Amphipoda	19	6.5	14	10.4
Mollusca				
Pelecypoda			2	1.5
Gastropoda			3	2.2
Coelenterata			2	1.5
Annelida				
Hirudinea	5	1.7	5	3.6
Nematoda			6	4.4
Platyhelminthes				
Cestoda			4	2.9
Fish				
Total occurrence	73	24.8	53	38.4
Pungitius pungitius	4	1.4	34	24.6
Coregonus artedii			2	1.5
Esox lucius	7	2.4		
Cottus cognatus	2	0.7	5	3.6
Catostomus commersoni	3	1.0		
Lota lota			3	2.2
Family Cyprinidae	2	0.7		
Family Coregonidae	10	3.4		
Plant Material			7	5.1
Surface food items				
Diptera adults			1	0.7
Small mammals	2	0.7		
No. stomachs with food	126	42.9	74	53.6
No. stomachs examined	294		138	

Table A6.3. Frequency and percent occurrence of food items in *Prosopium cylindraceum* from Rivière la Martre, 1975.

Food Item or Parasite	Occurrence			
	Lower River		Upper River	
	N	%	N	%
Insecta				
Diptera				
Chironomidae larvae			13	14.6
Unidentified larvae			6	6.7
Unidentified adults			6	6.7
Odonata nymphs			8	9.0
Trichoptera larvae	2	40.0	26	29.2
Ephemeroptera nymphs			5	5.6
Plecoptera nymphs	3	60.0	2	2.3
Hemiptera				
Corixidae			17	19.1
Coleoptera larvae			2	2.3
Coleoptera adults			3	3.4
Crustacea				
Amphipoda			16	20.0
Ostracoda			1	1.1
Mollusca				
Pelecypoda			3	3.4
Gastropoda	1	20.0	8	9.0
Annelida				
Hirudinea			8	9.0
Nematoda				
Fish remains			36	40.5
Plant Material			17	19.1
Surface food items				
Terrestrial insects			1	1.1
No. stomachs with food	4	80.0	53	59.5
No. stomachs examined	5		89	

Table A6.4. Frequency and percent occurrence of food items in Thymallus arcticus from the upper Rivière la Martre, 1975.

Food Item or Parasite	Occurrence	
	N	%
Insecta		
Diptera		
Chironomidae larvae	4	19.1
Unidentified larvae	14	66.7
Unidentified adults	17	81.0
Odonata nymphs	6	28.6
Trichoptera larvae	15	71.4
Ephemeroptera nymphs	6	28.6
Hemiptera		
Corixidae	20	95.2
Coleoptera larvae	3	14.3
Coleoptera adults	11	52.4
Crustacea		
Amphipoda	5	23.8
Ostracoda	1	4.8
Mollusca		
Gastropoda	1	4.8
Nematoda	3	14.3
Fish remains	4	19.1
Plant Material	21	100.0
Surface food items		
Total terrestrial insects	9	42.9
Orthoptera	2	9.5
Hymenoptera	6	28.6
Arachnida	1	4.8
No. stomachs with food	21	100.0
No. stomachs examined	21	

Table A6.5. Frequency and percent occurrence of food items in *Stizostedion vitreum vitreum* from the lower Rivière la Martre, 1975.

Food Item or Parasite	Occurrence N	Occurrence %
Insecta		
Diptera		
Chironomidae larvae	1	1.5
Odonata nymphs	5	7.7
Ephemeroptera nymphs	3	4.6
Plecoptera nymphs	1	1.5
Crustacea		
Amphipoda	3	4.6
Fish		
Total occurrence	18	27.7
Esox lucius	1	1.5
Lota lota	2	3.1
Family Cyprinidae	1	1.5
No. stomachs with food	27	41.5
No. stomachs examined	65	

Table A6.6. Frequency and percent occurrence of food items in *Salvelinus namaycush* from the upper Rivière la Martre, 1975.

Food Item or Parasite	Occurrence N	Occurrence %
Insecta		
Hemiptera		
Corixidae	4	44.4
Coleoptera adults	1	11.1
Odonata nymphs	1	11.1
Plecoptera nymphs	1	11.1
Crustacea		
Amphipoda	1	11.1
Nematoda	1	11.1
Fish remains	5	55.6
Plant Material	1	11.1
No. stomachs with food	8	88.9
No. stomachs examined	9	